SPEED TWEAKS: SUPCOM, STALKER & OBLIVION

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RADEON
GRAPHICS

IS RED DEAD?

DISSECTED:
Radeon HD2900XT
WE DECIDE IF IT'S ENOUGH TO BRING AMD BACK TO LIFE

Linux vs Linux

TOP FIVE DISTROS GO HEAD TO HEAD!

Bearlake busted

INTEL'S P35: CORE 2 CHIPSET SUCCESSOR OR MONUMENTAL NOTHING?

PLUS ESSENTIAL TECH!

- AUSSIE MMO FURY STICKS IT TO WoW
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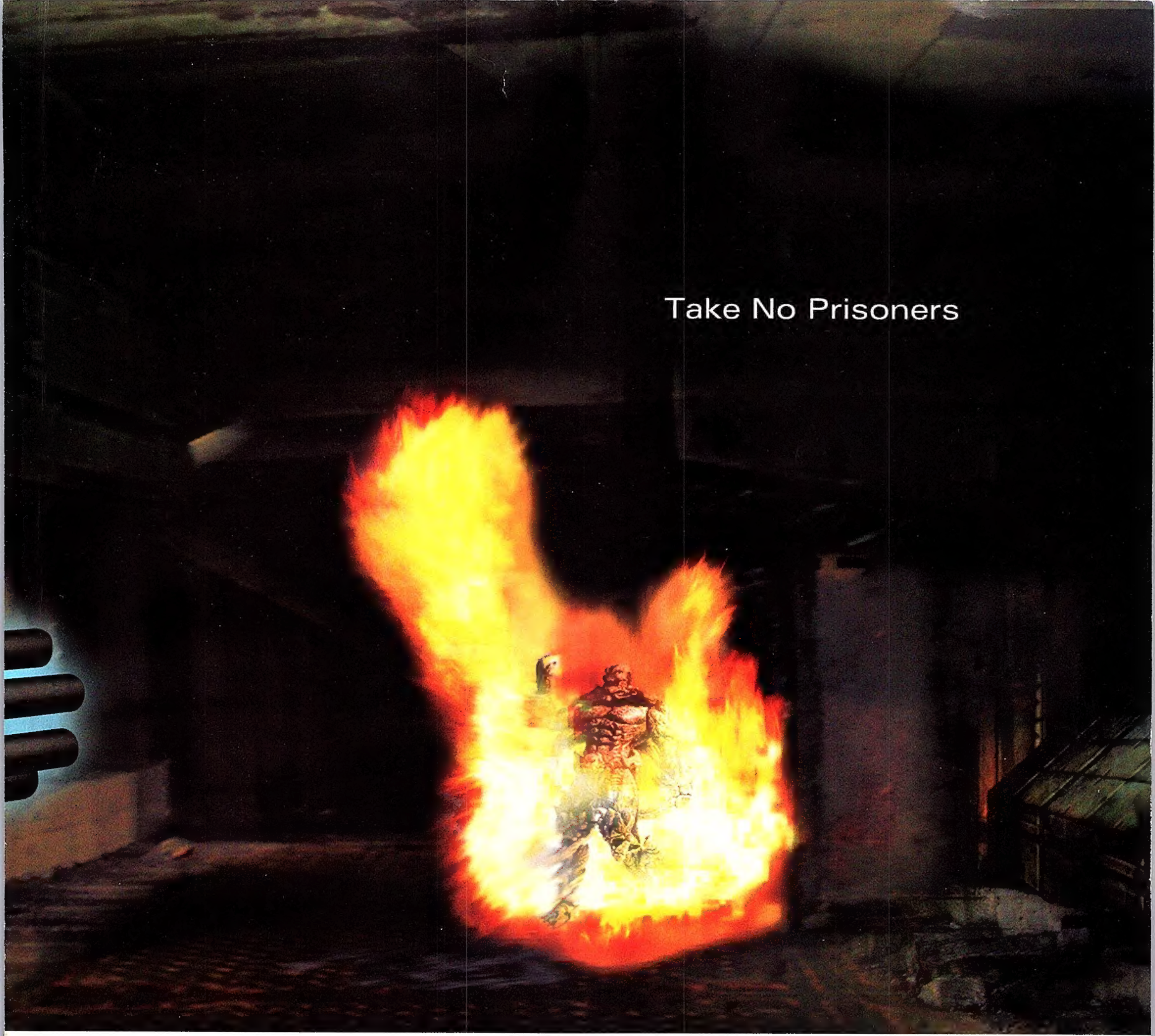

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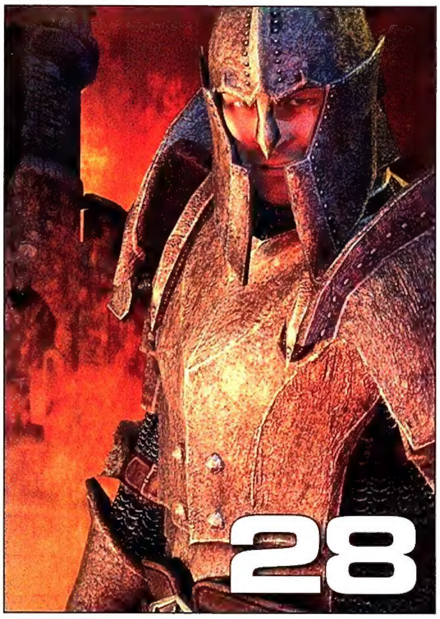
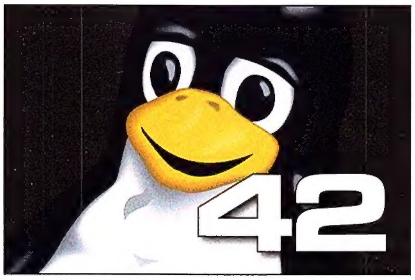
CONTENTS

ATi
Radeon
GRAPHICS
20





FEATURES

Is red dead? 20

AMD has sadly gone from weakness to weakness. First, the loss of the CPU crown to Intel and, by the looks of the results from AMD's latest card, the Radeon HD2990XT, the 3D graphics throne as well. You can read our final verdict on the situation here.

Speed tweaks for game freaks 28

If you're not playing Supreme Commander, then you'll be at S.T.A.L.K.E.R. And if S.T.A.L.K.E.R. isn't in your DVD drive, then it will be Oblivion. Regardless of which game you spend most of your time with, we have nine pages of performance tweaks and mod recommendations so you can enjoy these awesome titles at their best.

Bearlake busted 52

Four motherboards. Two sticks of DDR3. A new Core 2 chipset with the potential to be the overclocking king. Craig Simms did not bathe for the entire month to adjudicate the mud fight and eventually, declare a winner.

Head to head: Linux distros 42

Leigh Dyer grabbed the top five Linux distributions and ripped into them like the mad-crazy open source boffin that he is. Looking to install this powerful OS but not sure which one to choose? Your answer lies within.

Engine Room: Fury 68

What the hell is the deal with World of Warcraft? Why hasn't anyone been able to knock it on its arse? That's what Oz developer Auran wants to do, but in a completely different way to everyone else... and it appears it just might succeed.

Music in Linux, part 1 90

Leigh Dyer, again showing his innate multi-talented nature, begins rigging a supreme music commander centre using nothing but Linux and open source software. If you have a musical bone, muscle or hair follicle, then this could be the way for you to stretch it. Or comb it perhaps.

REGULARS

LOGIN

Update 8
New CPUs; giant displays; Fallout 3 takes off; Blizzard finally announces Starcraft 2.

Chat 12
We talk nicely to Richard Garriott.

X-Ray 15
Power cables? Not for Ashton Mills.

Technica Obscura 18
Ashton Mills wants the lying to stop.

HARDCORE

How we test 40
Don't even try to hide your excitement.

Gearbox 50
The latest buzz: Caffeinated mints.

Kitlog 60
Recommended PC parts for those after the ultimate, semi-ultimate and pseudo-ultimate machine.

Ground Zero 62
Dan Rutter exorcises his MTBF demons.

Hardcore reviews

MSI P35 Platinum 52
ASUS P5K/P5K3 Deluxe 52
Gigabyte P35-DQ6 52
ViewSonic VX2835wm 56
Thermalright Ultra 120 eXtreme 58
CoolIT Systems Freezone 58
XFX GeForce 8800GTX Ultra XXX Ed 59
Intel Core 2 QX6800 59

GAMEPLAY

Geekette 86
Kate Inabinet lives in fear of the day they nerf her +5 Cloak of Paranoia.

Game reviews

Myst Online 74
Spider-Man 3 76
God of War 2 78
War Tech: Senko no Ronde 80

Culture Shock reviews

28 Weeks Later 83
Nerds FC 84
Shogun Assassin 84
Le Chevalier D'Eon 84

TECHNIQUE

Input Output 94
Dan Rutter is an encyclopaedia of technology.

Hotbox 96
Cases that will make you cry.

Fallout 98
Logan Booker gets lost.

EDHEAD

Time to chip in?

2006 saw chipmaker AMD rake in US$5.25 billion in revenue, which, when compared to the US$3.94 billion that arrived on its doorstep in 2005, works out to be a tidy increase of 25%. Add in ATI's US$368 million from its operations before the merger, and the total comes in at 31%.

That's sweet, you might think – until you realise that Intel's marketing and ad budget for 2006 alone was in the area of US$2.5 billion, and extremely reliable sources place its 2007 spend at a number very close to this. So, what AMD makes in a year is about twice the amount Intel blows on ads with men covered in blue paint and catchy four-note jingles. What can AMD possibly do in the face of such overwhelming and incredibly scary opposition?

Play it safe, obviously.

The Radeon HD2900XT represents the first time in many, many years that a graphics card vendor has failed to top the best efforts of the competition with the debut of a new architecture. The HD2900XT doesn't even try – AMD itself has stated that the card is aimed at taking on the GeForce 8800 GTS and not NVIDIA's beastly GTX. Adding insult to this rather grievous injury, the GTX Ultra has increased the gap further to the point of being ridiculous.

But none of this matters. What matters is if the R600 series sells. While we'll be waiting a month or two for AMD to releases its mid-range cards (again, something else NVIDIA already has), this is the bread and butter for 3D chip vendors and where AMD will place its eggs, as far as the ATI brand and its video card business is concerned. Interesting times indeed.

The ever-delightful Craig Simms does an excellent job of elaborating on the specifics in our R600 feature this month, starting on page 20. Read it and be enlightened.

Keeping with the semiconductor industry, Intel has finally given birth to the P35, or Bearlake, chipset. Again, Craig has all the details in his three-page review, beginning at 52, and includes a sneak-peak at DDR3. If you're going Core 2 soon, it's well worth a look.

We also spent the month uncovering the best performance tweaks and gameplay mods for S.T.A.L.K.E.R., Supreme Commander and Elder Scrolls 4: Oblivion. These game can be painful to play at their visually impressive settings on systems that aren't running cutting-edge gear, so we've gone to the effort of finding the best combination of settings to bring the glamour to the normal people.

Considering there's a number of tweaks you can make that are simple and quick, and make a noticeable impact in performance, there's no reason not to have a flick through. You'll find it in the vicinity of page 28, or even on it.

I think that's more than enough from me. I'll will finish by saying that *Atomic* has fond memories of AMD, as well as genuine respect, and we certainly haven't given up on it yet.

Neither should you.

Logan Booker
lbooker@atomicmpc.com.au

Issue 76 winners: S.T.A.L.K.E.R. Collectors Edition + 5 shot glass sets. C. Carle, Kangaroo Flat VIC; S. Simson, Canning Vale WA; N. Matthews, Karingal VIC; S. Enright, Ryde, Sydney NSW; J. Schubert, Southport QLD. 5x Robot Chicken Vol 1. K. Dempsey, Revesby NSW; S. Gladman, Werribee VIC; S. Quattrucci, Lalor VIC; J. Scarff, Cranbourne VIC; D. Smith, Upper Coomera QLD.

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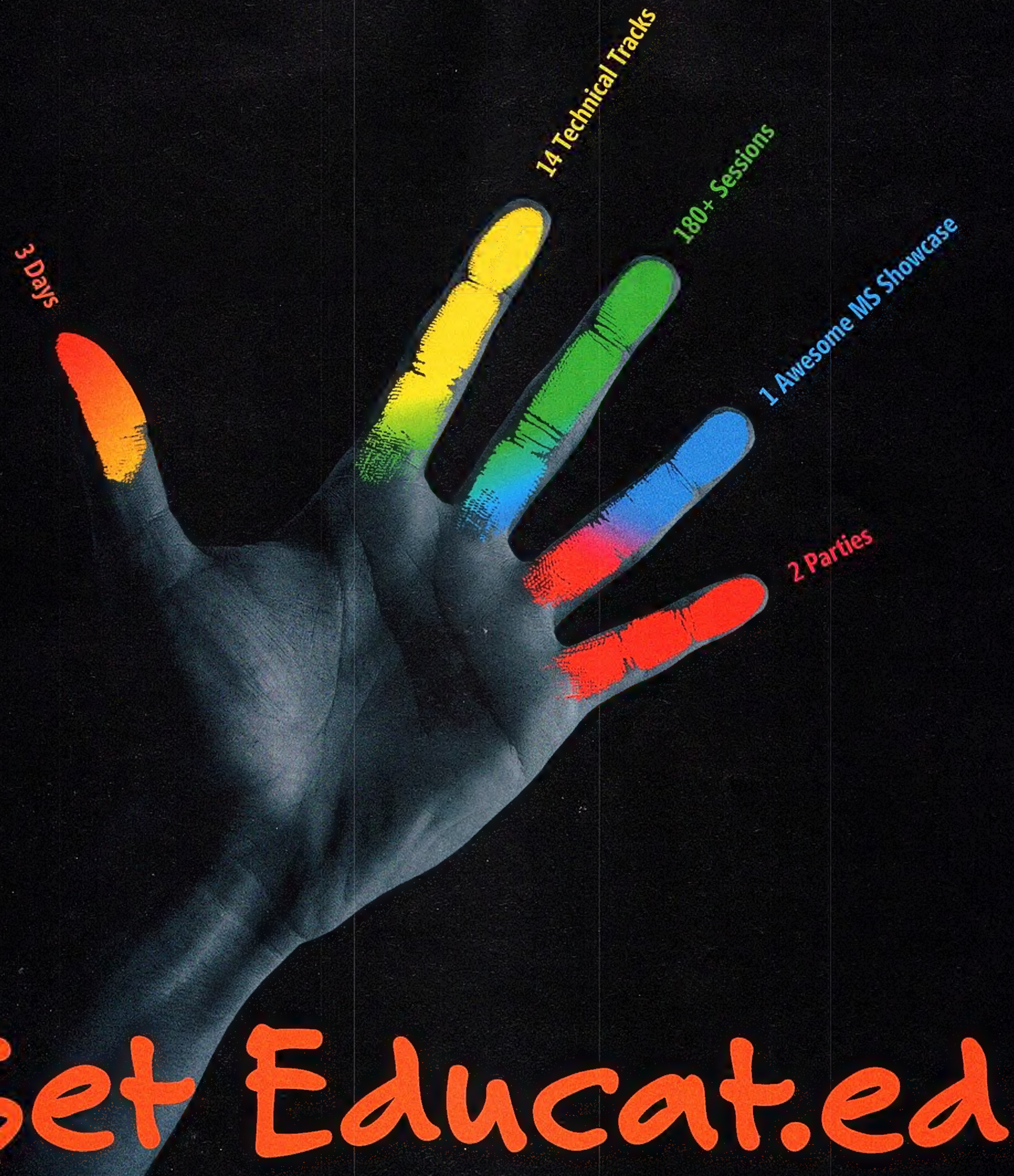
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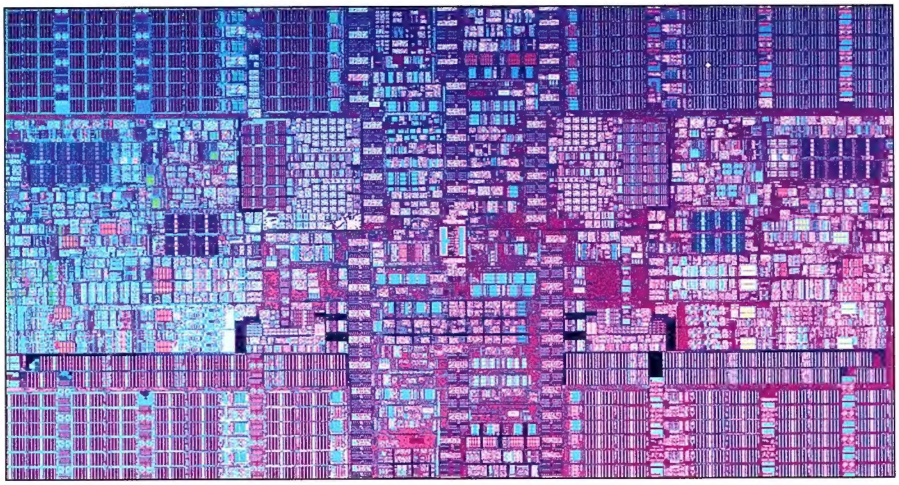


Processor prospective

AMD and Intel have been highly active of late, so **Craig Simms** decided to check in on the latest developments at our favourite CPU companies.

Athlon is no more. Well, almost. It'll be around for a little while yet, but its successor has been named: Phenom. As in phenomenal. All chips based on the K10 architecture will be blessed with the name, and as such codenames Agena (quad-core) and Kuma (dual-core) are now Phenom X4 and X2 chips respectively.

For those who need a refresher, Phenom comes with the following benefits: Up to 2MB of L3 cache for the quad-core part; SSE4 support; official DDR2-1066 support; independent core frequencies, reducing heat dissipation but seemingly not power requirements as voltage is still dictated by the highest utilised core; HyperTransport 3 and a split power plane allowing the CPU and memory controller to be fed separate voltages and hence, independent frequencies. Of course, you'll need a Socket AM2+ board to take advantage of these features.

The Athlon in the meantime will be repositioned as an entry-level chip, with the new low-power Brisbane core reaching a stunning 45W, despite being dual-core. A new PR naming system is in place, so expect to see Athlon 64 X2 BE-2000 series popping up soon. Mind you this also means a drop in speeds – the BE-2400 will be 2.3GHz, the 2350 2.1GHz and the 2300 1.9GHz.

In the enterprise arena, AMD is claiming the upcoming Barcelona quad-core part should outdo Intel's current CPUs with a 21 percent integer and 50 percent floating point advantage, according to Spec CPU2006.

AMD is having another crack at Intel's SSE dominance as well, with the AMD Performance Library 1.1. Video operations should see a nice boost, although we wonder if the decoding feature has some crossover with GPUs.

Also, 65nm Turion processors are shipping for notebooks, meaning less heat and more battery time for all who buy AMD-powered groin warmers. Finally, 45nm for desktop should be with us in the middle of 2008.

Impending Intel

Intel's upcoming 45nm CPUs will still greet us sometime before the end of the year, but word is that the things won't feature any lead at all.

The CPUs should come out at 3.33GHz and above, and run on a 1600MHz bus. Which is interesting, when you consider the P35 motherboards just released – and soon to follow X38s – that should support 45nm CPUs have 1333MHz as their default FSB. The boards are already more than capable of 1600MHz when overclocked, so we'll have to wait and see if official support will rise in the form of a firmware update, or if we'll suddenly see newer boards. The chips like AMD's new parts should allow per core frequency adjustment, with hints that dynamic overclocking could be enabled under single-threaded situations.

The words 'dual FSB' were also bandied about in regards to the server market, to combat AMD's Barcelona bandwidth thanks to doing just about everything on-die.

Intel has also managed to claw back the market share it lost to AMD over the last four years in just one quarter – while this is impressive, you have to remember that this is Intel, whose name already had plenty of presence, while AMD initially had to combat the 'A M who?' syndrome. It'll be interesting to see if AMD can strike back just as fast now, should the next generation of CPUs hits Intel for a six.

> “Intel has also managed to claw back the market share it lost to AMD...”

SHORT CIRCUITS

Nintendo®

Nintendo of Japan has started shipping Wiis that have been modified slightly to curb modchipping activities. Three pins required for current modchips have now been cut, making this a little difficult for hackers. We await the next salvo from the black hat side of the fence.

BM has released a dual core 4.7GHz Power 6 processor, the fastest processor now available for Unix systems. Built on a 65nm process, it doubles the speed of the previous Power 5 processor and packs an 8MB L2 cache.

Managed copy is finally making its way to HD-DVD and Blu-ray, meaning users can legally copy the content on their HD discs to other media, via AACS 0.93. This will likely require an Internet assisted update of standalone and software players. We say 'Making its way', because while the infrastructure is there in the technology, studios have yet to determine what they feel is within the bounds of copyright and distribution agreements, and hence have not yet set the rules surrounding the copy process. Prepare to wait a long time, and to be disappointed with the result.

NVIDIA is facing 51 lawsuits claiming that it has engaged in anti-competitive business and price-fixing, in some cases mentioning collusion with AMD to keep

Unreal expectations

Things aren't looking fantastically good for AGEIA, which was relying on Unreal Tournament 3 to be the killer app for its PhysX card. While the physics in the game are based on PhysX, those with quad-core CPUs will apparently have no issue running the physics engine.

Tim Sweeney, superstar extraordinaire, let the world know that there's a primary thread for gameplay and a secondary for rendering, so dual-core will finally see some decent use. Extra threads are run for those with more cores, including physics and data decompression. Things are looking good indeed for multi-core.

Unreal Tournament 3 should be with us Christmas this year.

See the big picture

Japan's NHK has demonstrated Super-Hi Vision – a technology allowing a video camera to capture a crazy resolution of 7680 x 4320. At this stage the camera is unable to capture full colour, and is restricted to monochrome – however it can capture a mind-boggling 4000 frames per second. Colour should be added reasonably easily, ignoring cost, by increasing the number of sensors from one to three.

Bandwidth requirements as expected are beyond the insane – uncompressed it requires 24Gb/s to get an image on-screen, with one second of video taking up about three gigabytes of disk space. To this end there's some tinkering going on with current MPEG-4 AVC codecs to try and squeeze this down a little. By linking 16 encoders in parallel the signal can be sent in realtime, reducing it down to a bitrate of 128Mb/s. The encoding unit is almost as tall as a human.

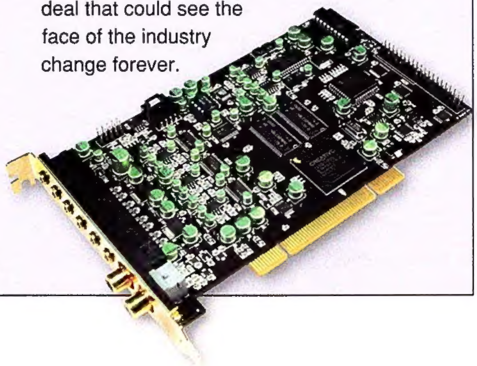
A sound system has also been developed to complement this crazy size, allowing a crazy 22.2 channels. That's 22 speakers and two subwoofers, something any kitted-out-shopping-trolley-fully-sick Honda Civic owner would love.

A standard is expected to rise in 2009, called Ultra Hi-Definition Video, or UHDV, but it won't be ready to be beamed into households until around 2020. This should mean Australia gets to see it in 3976, one year after 1080p is finally the broadcast standard.

prices high. We'll be more than interested in the outcome, especially considering the exhorbitant prices on nForce and top-of-the-line video cards these days.

OCZ has bought PC Power and Cooling, which should put it seriously in the PSU race, and hopefully give it a better distribution model so we can see more PCP&C PSUs out here.

Auzentech has released its third party Creative X-Fi based board, the Prelude 7.1, matching its audio engineering prowess with Creative's powerful chip and marketing dominance. This is a landmark licensing deal that could see the face of the industry change forever.



FUTUREPROOF

Gazing into the crystal ball of tech

Microsoft Gets Touchy Feely

Microsoft appears to have been inspired by the multi-touch display table that was demonstrated last year by Jeff Han of Perspective Pixel, allowing impressively innovative ways to display and manipulate data using only one's fingers. It's been rebranded 'Surface', and is featured as a 30" display embedded in a table. Allowing multiple inputs, it can zoom in on images such as those displayed in Google Earth simply by touching a finger from each hand on the board and spreading them apart. This also promises an intuitive level of image manipulation – but the most exciting thing is the level of interaction with objects placed on the surface, monitored by a series of infrared cameras. Video can be restricted to glass squares placed on the surface for instance, or when a data device such as a phone is placed on top and an image transferred to it via wireless, this is displayed as the image literally moving to the phone, and then an aura forming around the phone to show the transfer is complete. Surface should also be able to read barcodes, in total bringing us ever so closer to *Minority Report*-style technology.

Initially envisioned for such things as ordering meals in restaurants, casinos and hotels, the displays will first turn up at Sheraton hotels and Harrah's casinos. You really need to see it in action to appreciate it though, and *Popular Mechanics* has an excellent first look video here **www.popularmechanics.com/technology/industry/4217348.html**.

POST OF THE MONTH

It's been the biggest and most exciting month on the *Atomic* site in ages. So many cool new features and *Atomic* stuff. But, it's all for naught without the heart and soul of it all – you. We saw some really clever and beautiful posts this month, but we'd expect nothing less.

The winner of POTM 78 is:

RaYdeX [ACT] Biking Thread!

www.atomicmpc.com.au/forums.asp?s=1&c=5&t=1861&p=0

It has quickly grown into a very special *Atomic* thing. As a result of Raydex's initiative, more and more Canberrans get out most weekends. It's wonderful proof that an *Atomic* meet doesn't need to be a mighty piss-up – although post-ride they do a BBQ and celebrate with a few brews. It has many an Atomican outdoors and in the sun.

There's loads of Atomicans that have helped kick the club off, but the golden Logitech mouse goes to RaYdeX.

Every **Post of the Month** wins a fabulous **Logitech** mouse from the brilliant people from **Logitech**... Huzzah!

Rise of the PC

David Kidd wants to know how the world's most flexible and powerful gaming system is faring against next-gen.

The Xbox 360, Nintendo Wii and PlayStation 3 have attracted most of the limelight in the past two years. In fact, they've grabbed so much attention that it's easy to forget that the most widely purchased gaming platform, the PC, is still a strong, yet relatively small, force in the games industry.

Despite the increase in MMOs, sales of PC games haven't been growing as much as consoles – instead they've been shrinking over the past five years. Now, amid the fiercest game console battle in history, the PC is surely doomed. Or is it?

According to new research from US marketing company NPD, PC gaming is not only holding its own against the three-pronged attack of Nintendo, Microsoft and Sony, but it's seen an increase in game sales at retail.

The report showed that the entire gaming retail industry (not including MMO subscriptions and direct downloads) had increased by 18 percent over the previous year and, according to NPD, was a record breaker.

The breakdown of PC sales, as illustrated in a recent article on the report in the *New York Times*, showed growth of 1 percent over the previous year. It may not sound like much, but the important thing is that it's not a drop.

In Australia, recent figures from GfK also show growth in PC gaming, albeit by less than one percent in 2006. But if we explore the data a little closer, we find that console gaming is growing faster (doubling its value over the past five years, in contrast to only 50 percent growth for PC games), which means the proportion of PC gaming is actually shrinking.

On the basis of both these reports, we can conclude that PC gaming isn't sliding, but it's still being outpaced by the faster growing console market.

There is however one significant omission in this kind of retail analysis and it works against the PC games industry: Retail isn't the only type of payment.

Both GfK in Australia and NPD in the US base these reports on retail data, but the PC makes greater use of non-retail distribution and sales, like direct downloads and online subscriptions, than other gaming platforms.

According to both GfK and NPD, we can see that World of Warcraft, released way back in 2004, was still the highest selling game in 2006. Although each box purchased counts as a single sale, retail figures don't factor in the ongoing subscription costs – a total sum over US$500m in the US each year according to a report by Screen Digest. Thus, if we add it all together, spending on PC games in the US comes to around US$970m on retail purchases, plus an *additional* online subscription spend from MMOs (of which 54 percent is World of Warcraft).

And how does the growth in online gaming spend compare to the low one percent retail growth? The figure for online subscriptions is also increasing much more rapidly than the sale of boxed copies – 27 percent over the previous year.

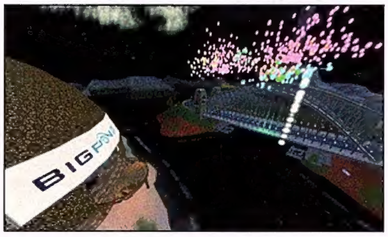
Evidently, the retail industry of PC gaming may not be setting the world on fire – it may even decrease over the years – but the increasing use of online subscriptions and direct downloads suggests a much healthier industry than its meagre retail spend implies.

PLAYSTATION 3

SHORT CIRCUITS

The source code to NCSoft's monster Korean MMO, Lineage III, has reportedly been stolen. According to Korean newspaper *Chosun*, seven former employees are suspected of selling the code to a Japanese game company during a job interview. NCSoft estimates the potential damage at US$1 billion.

Judging by an online petition at Project Open Letter, Second Life isn't handling the surge of players now logging in. The problems cited in the open letter include inventory loss, patchy stability and various UI problems. The petition already carries over 4000 'signatures'. **www.projectopenletter.com**



Gamers don't want to play long games, according to Silicon Knights president Denis Dyack. Long games should instead be split into shorter, self-contained games that form part of a related series, similar to a 'novella'. Incidentally, this is exactly what Silicon Knights is planning to do with its upcoming action RPG, Too Human. **toohuman.net**

Hellgate: London now has a price attached to its enhanced online service. The monthly US$9.95 fee will let players

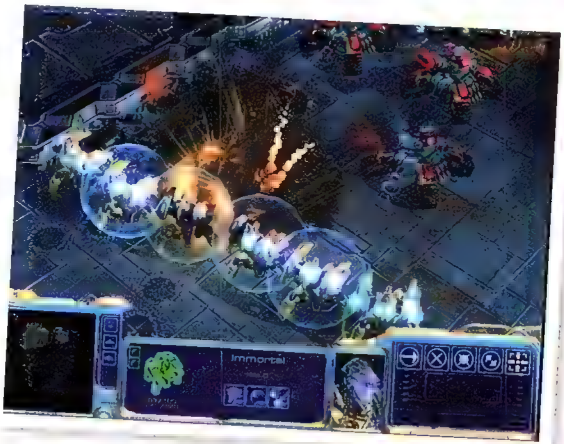
Starcraft 2 announced

Just like Starcraft, now in 3D!

Hear that? That's the sound of millions of hearts on the Korean peninsula missing a beat. Starcraft 2 is truly coming, complete with tweaked races, new units, and an overhauled graphics engine that adds a whole new dimension to the original – literally.

If you're not an SC fan, all you'll see is a 3D engine and a lick of paint, but that's because SC 2 isn't for you. SC's appeal is in its sport-like mechanics – simple, fast and refined – and Blizzard is using the original as a blueprint for SC 2. Consequently, only the original races are back, but with new units and tweaks to make them more distinct from each other.

The graphics engine will integrate Havok physics, use DirectX 10 (not necessarily exclusively) and be available on XP, Vista and Mac. Check out **www.starcraft2.com** for more info and gameplay trailers.



Fallout is about

News of the third outing drifts our way. David Kidd is there to catch the ashes.

Fallout 3 is really being developed and this time, it'll have a real production budget and real voice actors. First came Bethesda's teaser site at **fallout.bethesda.com**, which links straight to a frothing mass of community forums. Then came this little nugget: Liam Neeson will play the (vocal) role of the main character's father. If you believe Bethesda, the role was 'written with Liam in mind'.

Finally, we came across a little gem of Fallout 3 'nostalgia', which is what we refer to as pieces of news, screenshots and teasers that hinted at a possible sequel, but failed to deliver on it. In this case, it was the release of the Fallout 3 tech demo, codenamed 'Van Buren', which Black Isle was working on in 2003.

Download the demo of what could have been Fallout 3 at No Mutants Allowed (**www.nma-fallout.com**).

access new content, areas and other 'MMO-like' features. After purchasing the game, HG:L will still offer a basic online mode similar to the multiplayer dungeon hacking of Diablo. More information on the tiered service can be found at **www.hellgatelondon.com**.

One of the most addictive games in the world is about to get more potent. Sport Interactive, developer of the infamous spreadsheet game, Football Manager (previously called Championship Manager), is about to take the game online so players can compete with each other in global championships. The beta should be available by the time you read this at **sigames.com**.

Game: "Untitled"

PIPELINE Hot games to watch out for

Medieval II: Total War – Kingdoms

Release date TBA 2007

Creative Assembly is hard at work on an expansion to Medieval II: Total War that is so packed with content it could be full release. So far, the expansion features four new campaigns, over 20 new factions, 150 new units, new technologies, new maps, and more.

The campaigns are fully developed, historical depictions of Britannia, the Crusades, the Americas and the Teutonic Wars. Each campaign features authentic factions of the time, and will come with new battlefield and strategic features, like hero characters and permanent forts. Among the new units are the Canons of the Holy Sepulchar, Irish Calivermen, and the Constable of Jerusalem knights.

Platform PC
Developer Creative Assembly
Publisher Sega
Web www.totalwar.com

Sword of the Stars: Born of Blood

Release date May 2007

It's not that Sword of the Stars was a bad game, it just threw out the rulebook when it came to story, atmosphere and user interface. Despite its problems, SotS showed potential, with its distinct races and spectacular fleet battles. It's because of this that we're looking forward to the upcoming Born of Blood expansion, which will hopefully give it the polish it needs. It features a new race, the Zuul slave masters, 15 new weapons, 25 new technologies, a new diplomacy system, a trade route system and (fingers crossed) logical, consistent and modern GUI enhancements. Hopefully it'll be the slick, innovative game that SotS should have been in the first place.

Platform PC
Developer Kerberos
Publisher Lighthouse Interactive
Web www.swordofthestars.com

This is not Richard Garriott.

Richard Garriott

Alexander Gambotto-Burke talks with the creator of Ultima and the computer role-playing game genre.

atomic Your new company, Destination Games, is geared specifically towards MMO development. Given that the genre is so competitive, what do you think MMOs need to be successful?

Richard Garriott That's a good question. I think there are a number of factors – the MMO space is still in its infancy, and I think the rules that make a 'good' game are not very well understood or explored. But I think there's plenty of ways to fail in MMOs, and a handful of ways to succeed. But they're similar to any other game in that a surefire way to fail is to be derivative. When Ultima Online and EverQuest came out, you could be derivative or make a game that was almost identical, and do quite well. The market was so radically under-saturated that any high-quality offering got a reasonable amount of play. These days, though, if you do something remotely derivative, you're pretty doomed unless you do what WoW did, which was to do it better than anyone else. In general the best way to succeed is to identify new gameplay mechanics and new ways to devise these games.

atomic What is Tabula Rasa, your upcoming MMO, doing that innovates on traditional MMO design?

Richard Garriott One of the biggest things is wanting the player to feel special; to feel like the hero in a singleplayer game. The greatest feature of online games is that you can go on adventures with your friends; you don't have to do it alone. However, it's come at a hefty price: Your life has become, frankly, statistically pretty average in every way. Half the people playing are of a higher level than you, and the other half are of a lower level than you. If a new feature's been added overnight, when you log on, half the people will have seen it before you. You basically never win; you never get to be the hero. Instead, it becomes a level grind, where you're level 10, and then your friend goes up to level 11, so you have to grind to keep up with him, and you just repeatedly farm creatures for experience points.

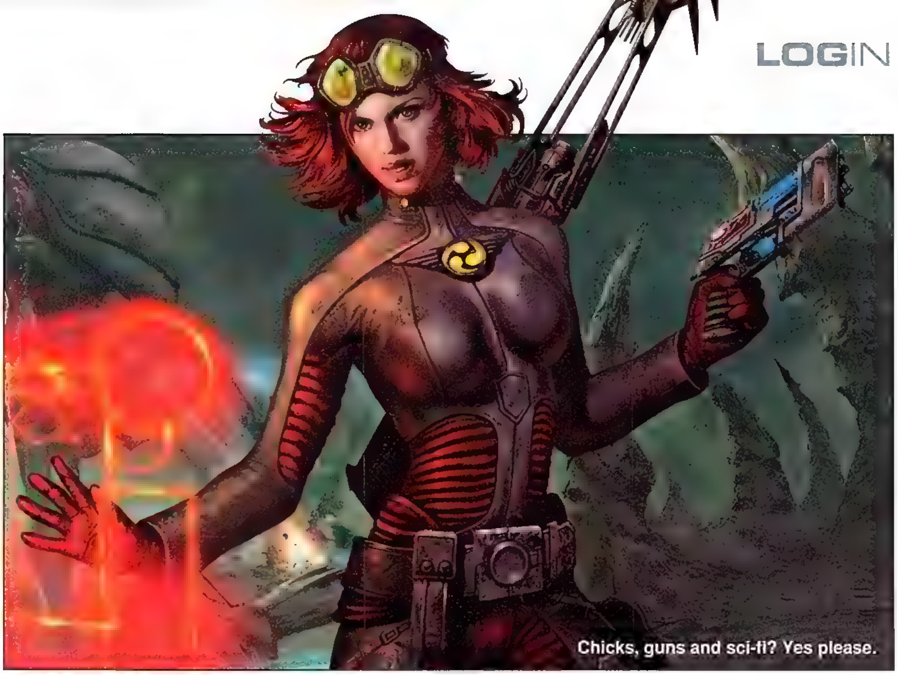
atomic How are you remedying this?

Richard Garriott The main thing is instances. Lots of MMOs have instanced spaces nowadays, but in most games, the way instances are used is to give you a private space to go and beat up the high-level monsters and get the high-level drops. You don't have to fight with the general public over who gets to kill the big dragon, basically. In Tabula Rasa, we use instanced spaces to replicate the kinds of experiences you have in a singleplayer game. They're storytelling spaces. You get to solve big puzzles, and complete sets of activities that result in some major success for you, and because your friends aren't in front of you, saying, 'I did it first,' you still feel accomplished and rewarded as an individual.

atomic Does the player's success in these instances have any overarching effect on his character, and, indeed, the non-instanced world?

Richard Garriott Yes, they do. There's a number of ways that when you finish an instance, they

> “These days, though, if you do something remotely derivative, you’re pretty doomed...”



Chicks, guns and sci-fi? Yes please.

can affect the outlying world. One I was playing earlier was set in what’s called the Province Research Center. The plot is that you’ve been seeing the dead bodies of your comrades taken off by the Bane, your alien enemies, to God knows where. And it turns out they’ve been taken to this facility, which you have to infiltrate and destroy. If you’re successful, you’ll take the factory offline for some time, and NPCs in the world will say things like, ‘Oh, wow, what a relief! It’s good to see our fallen friends avenged, plus, strategically, there’s a lower drop of those reanimated bad guys.’

atomic You’ve said in the past that you’re not a fan of the way players have to ‘grind levels’ in order to get ahead in most MMOs. What does TR do differently in this area?

Richard Garriott Well, we do have character levels – they start at one and go up indefinitely, although one to fifty is probably the range you’ll have to begin with. But you know how in most MMOs, the first decision is what race and class you want to be? And that combination is what you have for the rest of your character’s life? So if you choose to be a fighter, and halfway through the game you want to know what it’s like to be a mage, you have to start from the beginning as a mage. And I think that is a point where MMOs lose a lot of players. So in TR, what happens is you start by only choosing your name and gender. You start as a recruit, and after your first five levels, you make a decision about which side of the tree you want to take – for example, do you want to be a frontline soldier or a support specialist? And there are further branches from there. What’s great, though, is that you can save your character anywhere up and down this tree whenever you want. So, for example, if you’ve chosen to go from being a soldier to a commando, and then you want to try being a ranger, you load up the clone of your character you saved before becoming a commando, and this time become a ranger.

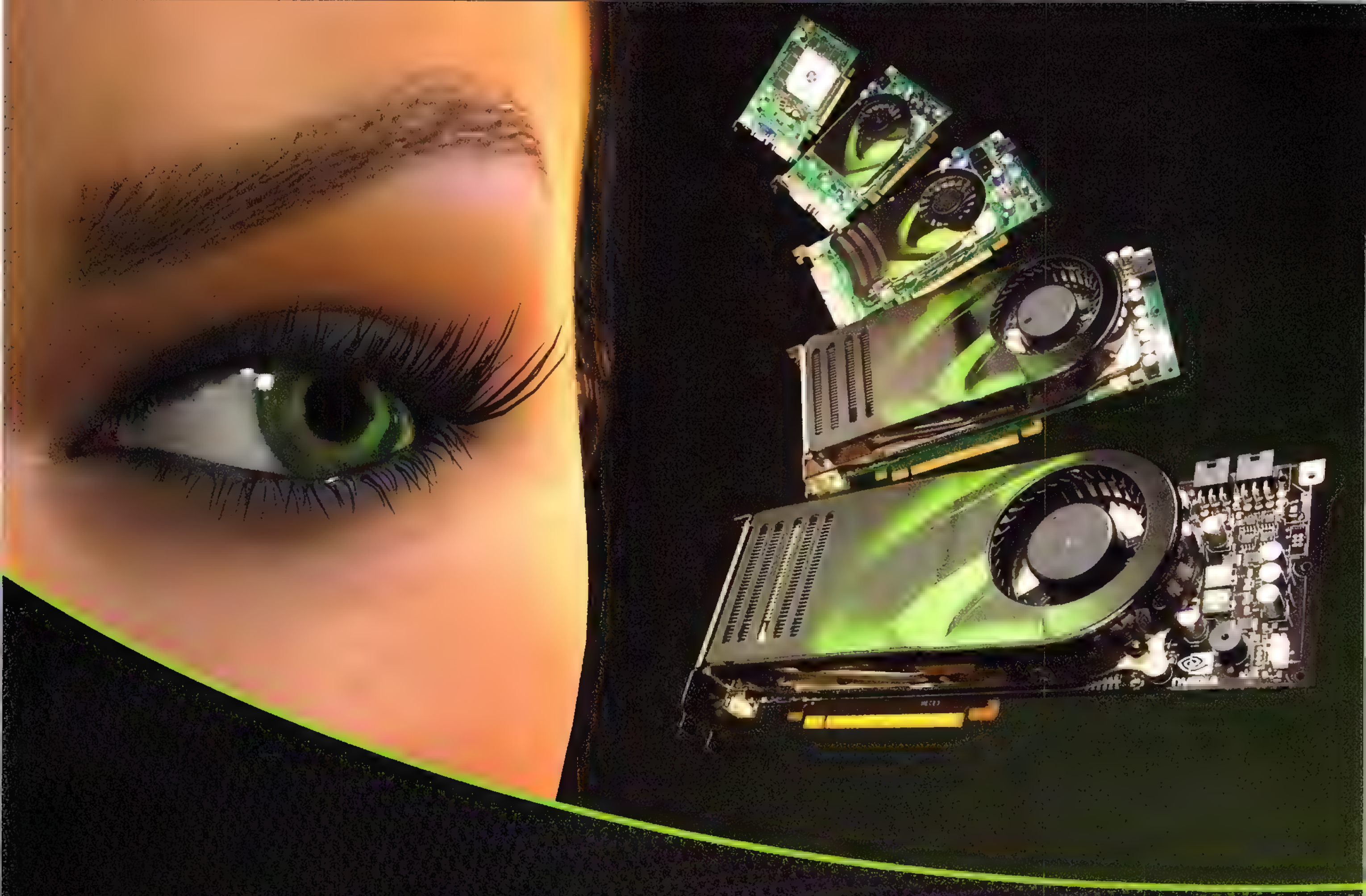
atomic Ultima Online is obviously now what you’d call a ‘conventional’ MMORPG, but do you still think working on it has helped with TR’s development?

Richard Garriott Oh, yes. Over the years, what I’ve become through working on the Ultima series and then Ultima Online, is what I call a ‘World crafter’. I’m someone who pays a lot of attention to detail, the world’s history, and the reality that makes it believable and compelling. And that skill has definitely helped and carried over into the new game.

atomic Finally, what are your thoughts regarding what EA is doing with Ultima Online?

Richard Garriott Umm, to be perfectly honest, I’ve only paid cursory attention to it. For a good while, they used to contact me to discuss changes. We had an agreement that if the original premises of the game were affected, we could at least consult on it, to try to keep the game in the same vein as the original. In the last few years, we’ve not done that so much, so I’m not even sure where they’ve taken it.

Can Tabula Rasa be the next World of Warcraft?



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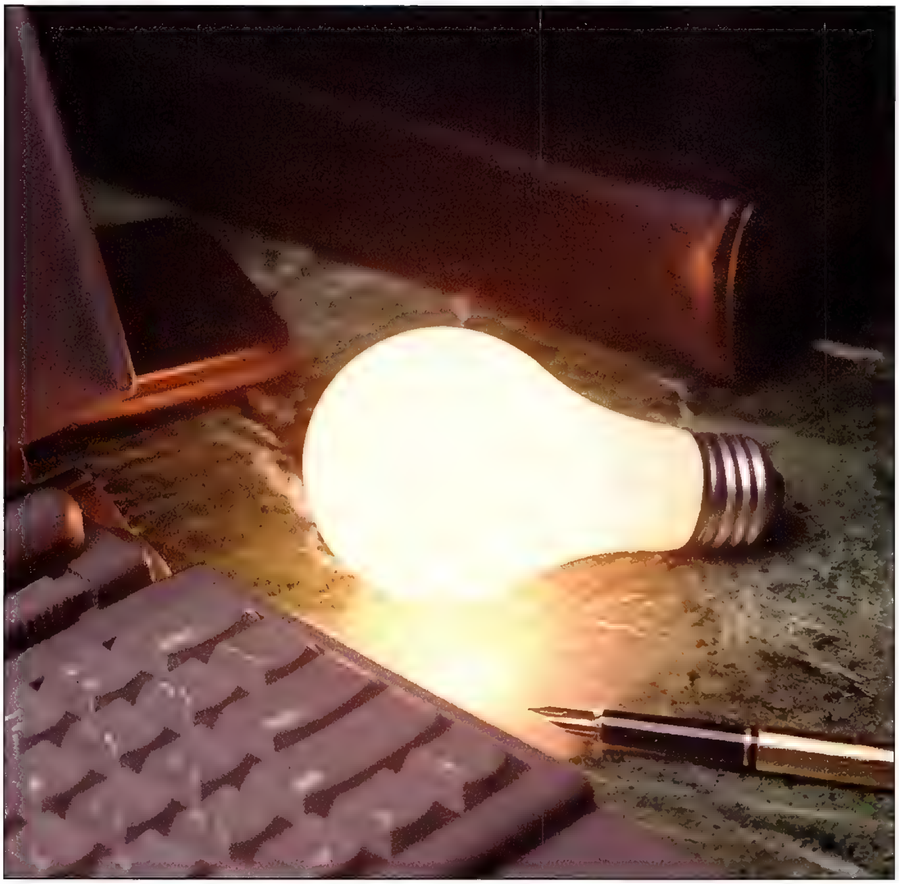


Power, without the wires

Can you imagine a world without power cords? It's almost here as **Ashton Mills** investigates.

Walking into your friends self-titled 'Room of Pwnage', you plonk your oct-core 9900 XXGTXX-based laptop, with extensible folding 24" screen onto his desk. Immediately, a small LED glows indicating there's power, and you fire up the machine for Command & Conquer 5: Revenge of Yuri's Tiberium Generals for some serious strategising. Before you get settled, you pull out your phone and iPod Microscopic and place them on a nearby bench and, as with the laptop, a little glow from the screens lets you know the batteries are now charging.

And there's not a wire in sight.

It's the magic of wireless power, and while it sounds science fiction-ish, it's actually already here now – well, at least the beginnings.

How so?

We've grown up with wires and cables around computing – from power to SATA to networking and more. It's the natural order of things – electrons need a medium to travel, and wire is it. Everything we use and everything we have, in terms of computing and gadgets requires wires. That's just the way it is.

Only we used to think the same about the telegraph until radio waves were exploited, and then suddenly we had communication across continents without wires at all (the first successful trans-continental radio message was between England and France in 1902).

Today wireless communication abounds – and it's here the crux of wireless power lives. If we can transmit data over the airwaves, why not power?

Looking to the past

The idea of transmitting power wirelessly isn't new. In fact, it's rather old. Nikola Tesla, who you're probably familiar with in terms of his Tesla coils, used the same principles in an attempt to transmit power through air with the Wardenclyffe Tower, effectively a giant Tesla coil that began construction in 1901. The tower's primary purpose was wireless communication, but Tesla had a dream of using it also to transmit power around the world with just handful of them placed around the globe.

> “Tesla had a dream of using a handful of Tesla Coils to transmit power around the world.”

Unfortunately for Nikola – who eventually died in relative destitution – funding for the tower dried up and it was never completed.

Today our understanding of electromagnetism and the fundamentals Tesla played with is more advanced, but it's thanks to Tesla's pioneering efforts that we have technologies like radio (Tesla is credited with the invention, although Guglielmo Marconi was said to have invented it first), the induction motor (we'll get onto this in a moment), and alternating current (AC) which effectively revolutionised the world.

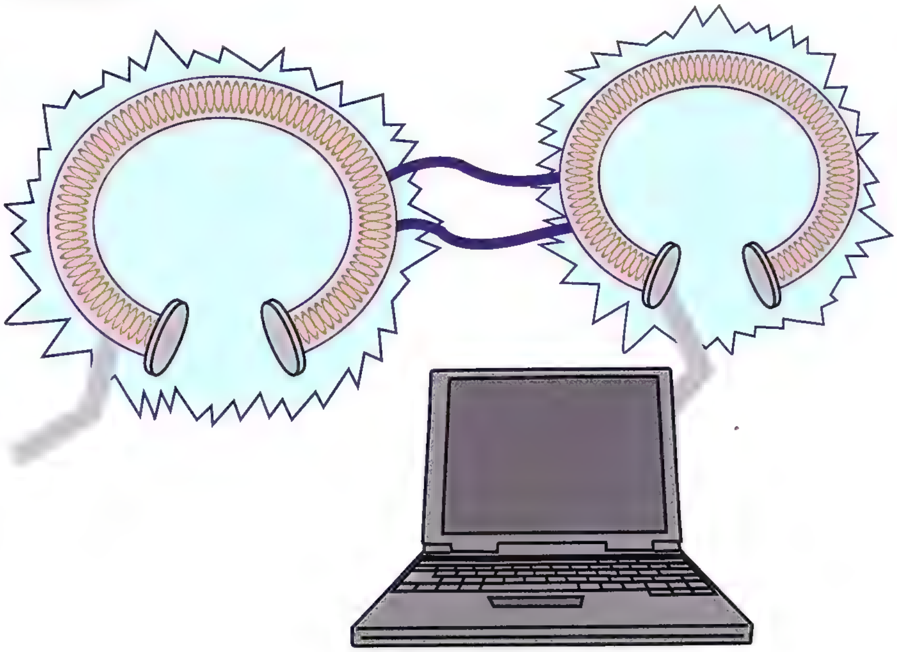
But it's the age-old idea of wireless power that still sparks (pun) the fascination of the world's new inventors. There are already products available that offer wireless power – at least for small devices – but it's still a developing area of technology with a long way to go.

Today, there are a number of forms of wireless power being developed.

Induction

Do you remember you Scalerlectrix race cars as a kid? Or electric train sets, and remote control cars? All of these use electromagnetic induction to drive tiny motors ('induction motors'), and is the same principle that powers the fans in your PC or the motor in your fridge.

At its simplest, electromagnetic induction is the process of generating an electric current from a conductor in a changing magnetic field or, just as useful, the reverse. It's the application of a current to wire coiled around magnets



Resonance allows electrons to arc directly to matching resonant coils.

that creates a fluctuating magnetic field for an induction motor which, in turn, can drive a rotor to create motion.

This leverages the property of the magnetic fields created whenever electricity flows through a wire. Coiling the wire amplifies the effect.

Any other conductor within this field will induce a current, and so in what's known as *inductive coupling* two coils can be brought close together, but without touching, and induce a current in one coil when current is applied to the other – effectively wireless power, and the same process that allows transformers to work.

It's all good, except it's very short range. Higher voltages or larger coils can increase the range, but a lot of the energy is wasted in the expanding magnetic field.

Today a company called Splashpower already makes a product called the Splashpad that is essentially a powered coil loop which, when a compatible device is fitted with a similar loop and placed on its surface, induces an electric current so the device can charge. There are a number of advantages to this system, not the least of which is that you can charge multiple devices at once on a single pad. Currently the devices can't charge laptops, although technically it would be possible if the induction could be made more efficient.

Speaking of which…

Resonance

Induction works well for lower power and over short distances, but pumping in more juice – while creating a larger field – wastes most of the power because it extends in all directions, and any chargeable devices intercept only a part of it.

Resonance, also known as *non-radiative electromagnetic energy resonant tunnelling* (say that fast to impress a date), takes induction and attempts to extend its range, and more importantly, efficiency, by allowing electricity to almost 'tunnel' directly from one coil to another by relying on the resonant properties of each.

Say what?

Resonance has been explained in terms of musical instruments – strike a chord on an instrument such as a violin and the same vibrations can be felt in an adjacent violin, or so we're told. All materials, objects, everything have a particular electromagnetic resonance. If a transmitter and receiver can be attuned to the same frequency, their resonant properties will allow electrons to jump directly between them instead of being wasted in a general magnetic field.

The magic ingredient with making resonant coils is the addition of capacitor at the end of the coils that allows them to be attuned to a particular frequency.

Resonance could provide enough power to drive a laptop or larger, and all from a transmitter coil up to metres away. Theoretically, with a number of transmitters placed throughout a house, an entire home could be driven by wireless power.

Radio

What about radio? After all, antennas pick up radio waves of particular frequencies and current is produced – that's how you receive your JJJ.

Whereas resonance tries to make the transmission of power more efficient, advances in radio frequency-based power transmission focuses more on the reception.

A company called Powercast has developed radio transmission and receiving products that hinge on the receivers being able to capture up to 70% of radio frequency energy, compared to some 10% that a normal receiver might pick up.

One of the more interesting facets of Powercast's products is that radio frequency noise works in its favour – the more reflections from walls and other objects, the more waves that reach the receivers and are turned into power.

However as usual range quickly dissipates effectiveness and, more importantly, the power produced is less than the other methods. While it may not be enough to power a laptop, it can recharge a phone, and probably enough to power wireless keyboards and mice – and that would be cool, a wireless mouse you never have to charge.

Future shocks

The most recent advances in wireless power are coming from a group of researchers at the University of Tokyo who have demonstrated a 'power mat' that drives anything placed on it – in this case a sealed LED, placed in a goldfish bowl with occupant goldfish and water, illuminated when the bowl is placed on the mat.

The technique uses induction, but like resonance, tries to focus the power just to where it's needed. Here, the power mat consists of layers of coiled wire and new organic (pentacene) transistors, allowing the mat to direct power only to the coils that are needed.

Ultimately, all these methods are different sides of the same thing – electromagnetic waves. From radio frequencies to microwaves to light, there are different properties we tap into and each has advantages and disadvantages.

So when are our homes going to be fitted with these things in the walls so we can say goodbye to cables and plugs forever? It might eventually depend on a multitude of products – long range, resonant sources for charging computers and appliances, and short range weaker sources for handheld devices for example. Then there's interference (at least, with induction) – radio and TV could be affected by local power transmitters.

One thing remains certain – the propensity for wires tangling themselves is a strong enough drive if there ever was one, to refine the technology of wireless power. Just think: How nice would your desk be without that tangle of wires behind it?

Experience the Thrill of Overclocked Speeds

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ASUS P5K3/P5K Motherboards Provide Superb Options for Overclockers with Super Memspeed Technology

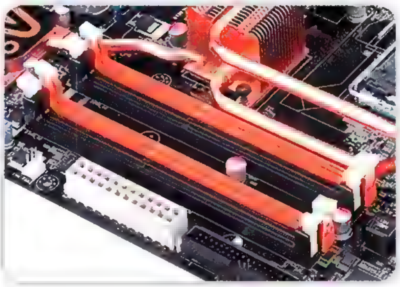
Advances in cutting-edge computer technologies usually affect motherboards the most. In this respect, the ASUS P5K3/P5K series of motherboards appears ready to herald in a new evolution in motherboard hardware standards. With inherent support for the Intel® P35 Express Chipset, a FSB of up to 1333, Super Memspeed Technology, a new generation 8-phase power design and much more, this series of motherboards looks set to transcend new levels of motherboard performance.

Utilise the Power of the Intel® P35 Express Chipset

The Intel® P35 Express Chipset is the latest chipset designed to support the next generation 45nm CPUs; and is able to support up to 8GB of dual-channel DDR3 1066/800 MHz and DDR2 800/667 MHz memory modules. It also supports 1333/1066/800 FSB (Front Side Bus), PCI Express x16 graphics and multi-core CPUs.

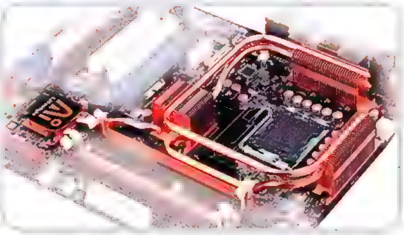
Embrace the DDR3 Trend and Surpass DRAM Limitations Automatically

The main difference between DDR3 and DDR2 memory is the doubled max transfer rate of 1600 versus 800. DDR3 memory also reduces power consumption by 30% in comparison to current commercial DDR2 modules. With such advantages, it is no wonder that memory trends will slant towards DDR3. ASUS's leading R&D has made support for this memory trend a reality now with the ASUS P5K3/P5K series of motherboards. With native DDR3 1333 support, it will offer users the speed boost they so readily crave for future memory intensive applications. ASUS's extensive R&D has also managed to surpass current FSB and DRAM ratio proportions by designing the ASUS Super Memspeed Technology - the latest technology in providing precise overclocking options. ASUS Super Memspeed Technology calculates the most accurate FSB/DRAM frequency proportions without wasting any performance while enhancing overclocking capabilities - boosting memory speed by up to 72.6%.

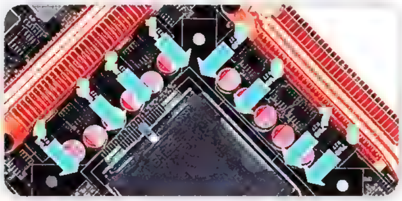


Noiseless Cooling Solutions

ASUS's solution in addressing the issue of PC heat generation is twofold - with the new generation 8-Phase Power and Fanless Design Heat Pipe giving users cooler and quieter operations. The new generation 8-Phase Power Design provides a highly efficient operation that generates less heat (at least 15℃ (59℉)) than other conventional 4-phase power designs. The P5K3 Deluxe version of this motherboard series comes with the Pure Copper Heat Pipe design which even more effectively directs the heat generated by the chipsets to the heatsink near the back I/O ports - where it can be carried away by existing airflows from the CPU or a bundled optional fan. This design effectively lowers temperatures by up to 16℃ without having lifetime problems that a default chipset fan design has.



With innovative memory overclocking margin technologies, cutting-edge support for future DDR3 memory trends and exclusive ASUS cooling solutions, the ASUS P5K3/P5K series of motherboards once again raises the bar for motherboard hardware standards.



	P5K3 Deluxe /WIFI-AP	P5K Deluxe /WIFI-AP	P5K
Chipset	IntelR P35 / ICH9R		IntelR P35 / ICH9
Memory	DDR3-1333/1066/800 MHz	DDR2-1066/800/667 MHz	DDR2-1066/800/667 MHz
System Bus	1333 / 1066 / 800 MHz		
Graphics Slot	2 x PCI-E x16 CrossFire at x16, x4		
Gbit LAN	x 2		x 1
Audio	8CH HD		
Storage	1*Ultra DMA 6*SATA3.0Gb/s 2*External SATA 3.0Gb/s		1*Ultra DMA 5*SATA3.0Gb/s 1*External SATA 3.0Gb/s

Advertisement

TECHNICA OBSCURA The big picture behind technology and the world around us

The web of a thousand lies

The Internet whispers sweet nothings to Ashton Mills in his sleep.

It sounds corny, but if you think about the various stages of human evolution and the violent ages that have marked our existence, then the age in which we live – the Information Age – seems tame by comparison. Yet, in truth, it's perhaps the most remarkable development in our growth yet.

Consider first that language and thus communication is the single largest innovation humankind has ever made, and that it drove the development of human progress to the world we have today – a race that can touch the stars. And now consider that, relatively recent decades of telecommunications aside, the Internet is galvanising a pace of development unseen in our history – because for the first time the entire planet (well, almost) is networked, billions of minds in communication with each other across the globe, at any time, all the time. And we sit at just the *beginning* of this amazing revolution.

> “Where once mainstream media was the voice of the people, now the people have found their own voice.”

But I digress – back down to Earth, what does this look like? Well, for one, everyone can have a voice and be heard, which is exactly what we're seeing more and more. Where once mainstream media was the voice of the people, now the people have found their own voice: Everyone can have a webpage, everyone can have a blog. In fact, it's the voices of the masses that are becoming the new form of content dissemination. Bloggers have become tech journalists, news reporters, entertainers and a voice for the public. People don't need to rely on newspapers, magazines, TV or radio anymore.

Where once publishers were the gatekeepers to content much like the RIAA is to the music business, and through which the Internet can make everyone a distributor of music, so too the Internet has made everyone a publisher.

So where does that leave publishers?

Like every other sea change, they need to adapt. At *Atomic*, the importance of the Web has always been self-evident. The *Atomic* website has been an integral part of the magazine since its inception, two mediums for the *Atomic* message each optimised for their audiences. Not that I'm just beefing it up because we're *Atomic*, but no other magazine has been able to match the loyal following *Atomic* has for its online component. And we're always striving to lead the curve.

And that brings me to another role for publishers.

Vernor Vinge, in his book *A Fire Upon The Deep*, painted this beautiful and disturbing image of a galactic-wide Internet, extrapolating the medium we have today across a galaxy of worlds. In it the Net becomes 'The web of a thousand lies' because any truth is swamped by the sheer volume of noise that drives it. How can you trust what you read?

Already the volume of content on the Internet has made a medium where you can't take everything at face value, from falsely-edited Wikipedia entries to multimillion dollar multinationals trying to buy loyalty with fake YouTube videos ('All I want for Christmas is a PSP!'). While everyone can be a publisher, not everyone can be a trusted source, and that's where traditional media can step in with its decades of experience and provide.

But no one, really, can predict the publishing landscape, paper and online, a decade from now. The Net is still but a babe, and it's already completely revolutionised how we communicate, do business and live our lives every day.

And with communication the very seed of our success, here's to the network that gives everyone a voice to be heard.

Ashton takes fan mail in the form of chocolates and naked pictures of your Mum.
amills@atomicmpc.com.au

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RAGE ON, RADEON

AMD finally gets its R600 out, in the form of the HD2900XT. Craig Simms gets on it.

	AMD HD2900XT	NVIDIA 8800 GTS
Fabrication process	80nm HS	90nm
Core speed (MHz)	742	500
Memory speed (MHz)	1650	1200
Shader domain speed (MHz)	742 (locked to core speed)	1600
Number of shader units (Note: these are calculated differently)	320	96
Memory capacity (MB)	512	320/640
Memory bus width	512-bit	320-bit
Memory type	GDDR3	GDDR3

Hot damn. R600 is finally here, and none too soon for AMD.

NVIDIA continues to dominate the DirectX 10 field, and has done so for a good six months. Well, sort of – while it may have had a DirectX 10-capable card, until very recently there's been three-fifths of bugger all in regards to DirectX 10 content.

So those who argue ATI is late to the party have missed the point – the party hasn't even started yet and NVIDIA arrived a few hours early, albeit in a very pretty green dress, wooing all the DirectX 9 boys and developing a fierce following before the other girls even arrived.

Convoluted metaphors aside, AMD needed something amazingly good to overcome NVIDIA's 8800 series, and what we got was… odd. As with all classic stories, we should start at the beginning.

In terms of products, the new cards are definitely AMD-owned, while the ATI name lives on as a brand – so rather than just being a Radeon, everything is now an 'ATI Radeon'.

Also changed is the 'X' prefix that has been with us for so long. So intent on the cinema experience is AMD that all products now begin with an 'HD' – hence what we are looking at today is the AMD ATI Radeon HD2900XT.

Those familiar with ATI nomenclature will realise the XT is one rung down from the top in the performance stakes, the numero uno pooch usually bearing the 'XTX' moniker. For now the 80nm HD2900XT is it for the top-end for AMD, which is curious as price/performance-wise it's aimed squarely at the 8800 GTS – leaving NVIDIA to run away with the pole position on two cards, the 8800 GTX and 8800 GTX Ultra.

At this stage there are no plans to bring an XTX to the retail market – the XTX pictures surfacing on the Web were simply XTs with a different cooler for the OEM market – although several rumour mills are churning out something about Q3 of this year. This will quite possibly be a 65nm revision of the top-end card, because when the mainstream cards hit in June – HD2400/2600, in Pro and XT variants – they'll already be on the 65nm process.

There are two amusing things about the launch of AMD's DirectX 10 line. The first is that the oft-delayed HD2900XT was pushed back a final time so AMD could launch an entire family simultaneously. Except that the mainstream cards were instead 'paper-launched' with the HD2900XT, and essentially delayed again. This foible allowed NVIDIA to get its 8500 GT, 8600 GT and 8600 GTS onto the market. One can only assume this is as a result of AMD tackling the massive task of integrating ATI into its bulk.

SPECIFICATION

Price $595 **Street Price** $577
Supplier Australia IT
Website www.australiait.com.au

The second thing is the cards are bundled with Half-Life 2 Black Box vouchers – featuring Episode 2, Portal and Team Fortress 2. Those with a decent memory will remember the debacle surrounding the X1K series, which was meant to be launched along with Half-Life 2 and include a copy of the game – only to have Valve delay by over a year and leave ATI having to supply vouchers instead, and, if you'll pardon the pun, red-faced.

Well Valve almost did it again to ATI, cancelling the Black Box after all the vouchers had been printed and deciding to only sell the Orange Box – same deal, but with the original HL2 and Episode 1. Fortunately this decision only affected the retail version of Black Box – ATI card buyers will still have access to all the games through Steam.

But enough about Valve and NVIDIA – we're here today to look at AMD's 700-million transistor monster and decide whether it was worth the wait.

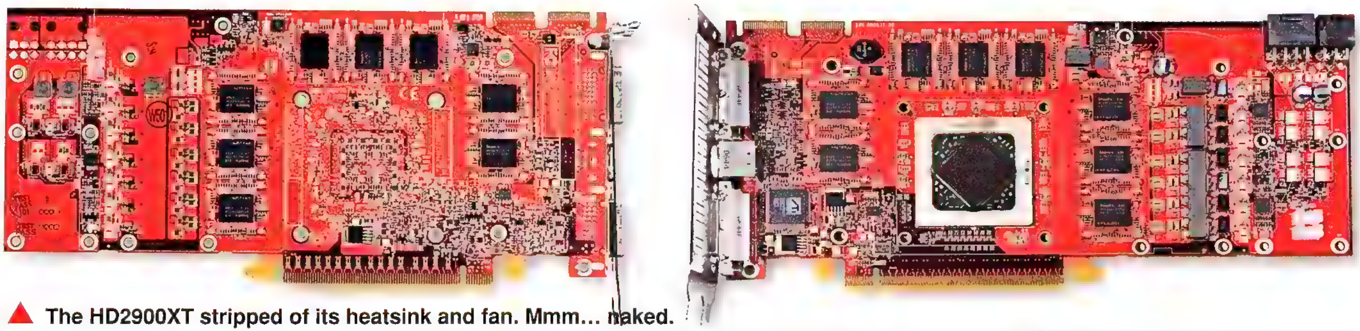
AMD needed something amazingly good to overcome NVIDIA's 8800 series, and what we got was… odd.

High definition tech

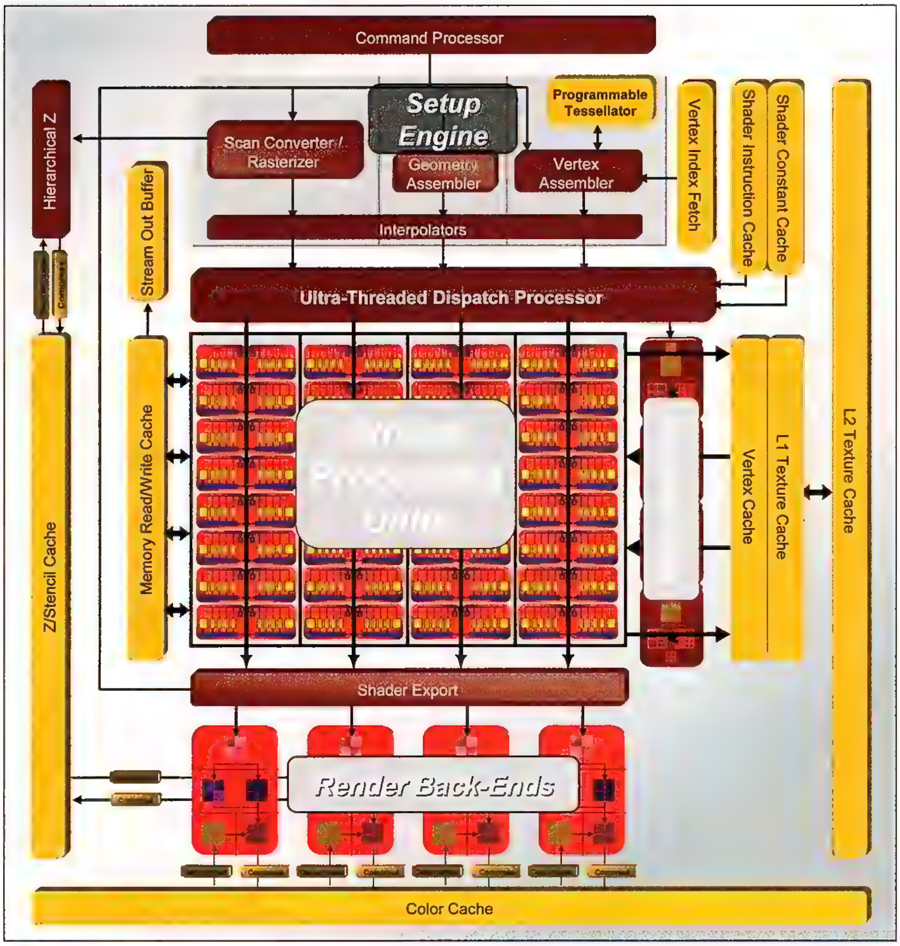
The HD2900XT is a long card at 241mm – this puts it squarely in between the 8800 GTS and GTX. It's quite heavy as a result of its heatsink, and very securely put together with a metal bracket on the back, giving it a weight of 952g compared to the 8800 GTX Ultra's 766g and the 8800 GTS' 684g.

It follows the same 'blower' configuration on the heatsink as NVIDIA's parts, with a 75mm fan pushing hot air out of the case as well as from the GPU. Curiously a second header is featured on the board – potentially to power more exotic cooling solutions like a water-cooling pump as well as a fan.

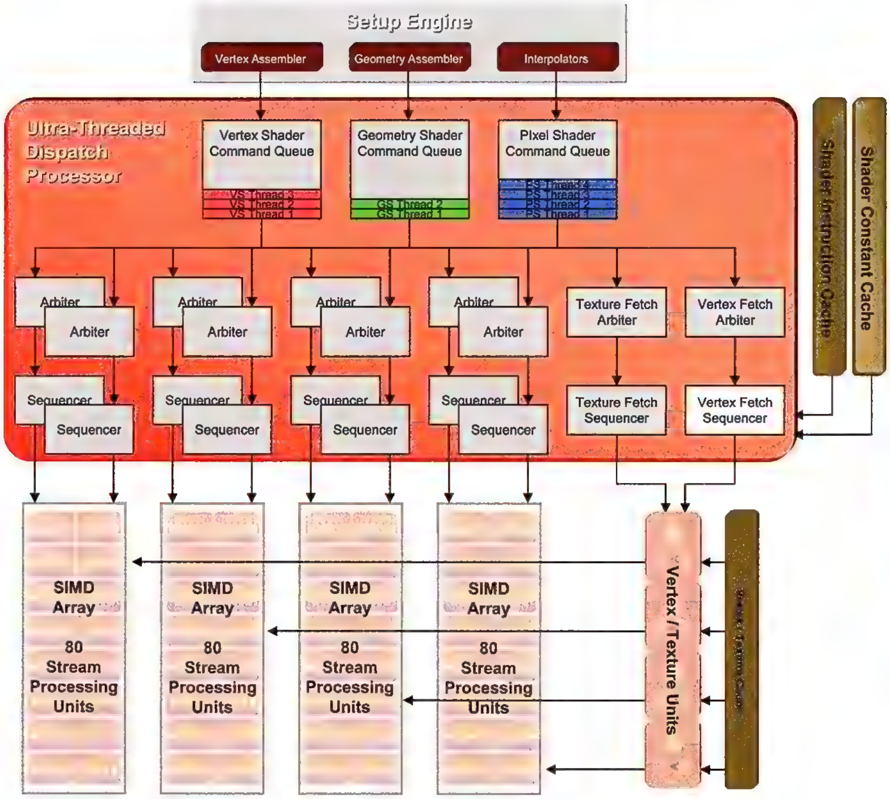
Two power connectors are present – one eight-pin and a traditional six-pin. If you're in doubt as to whether the industry will move to eight-pin power or not, PSUs are already on the shelves with dual eight-pin connectors, and the 8800 GTX Ultra has the empty holes ready in the PCB to support an eight/six-pin configuration like the HD2900XT,



▲ The HD2900XT stripped of its heatsink and fan. Mmm… naked.


Command Processor
Hierarchical Z
Scan Converter / Rasterizer
Setup Engine
Geometry Assembler
Programmable Tessellator
Vertex Assembler
Vertex Index Fetch
Shader Instruction Cache
Shader Constant Cache
Stream Out Buffer
Interpolators
Ultra-Threaded Dispatch Processor
Memory Read/Write Cache
Z/Stencil Cache
Vertex Cache
L1 Texture Cache
L2 Texture Cache
Shader Export
Render Back-Ends
Color Cache

The R600 is quite the engineering feat.


Setup Engine
Vertex Assembler
Geometry Assembler
Interpolators
Ultra-Threaded Dispatch Processor
Vertex Shader Command Queue
VS Thread 3
VS Thread 2
VS Thread 1
Geometry Shader Command Queue
GS Thread 2
GS Thread 1
Pixel Shader Command Queue
PS Thread 4
PS Thread 3
PS Thread 2
PS Thread 1
Arbiter
Sequencer
Texture Fetch Arbiter
Vertex Fetch Arbiter
Texture Fetch Sequencer
Vertex Fetch Sequencer
Shader Instruction Cache
Shader Constant Cache
SIMD Array
80 Stream Processing Units
Vertex / Texture Units

The Ultra-Threaded Dispatch Processor can indeed handle many threads.

ATI opted for a 512-bit memory bus and 512MB of GDDR3 – it should get interesting once we get to high res, large texture games.

despite being a dual six-pin solution.

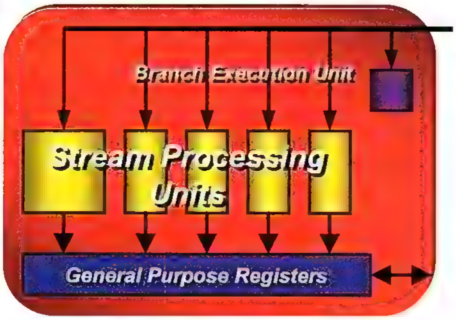
Unlike NVIDIA's odd 320-bit/640MB for the GTS and 384-bit/768MB for the GTX, ATI have opted for a 512-bit memory bus and 512MB of GDDR3 – which should get interesting once we get to high resolution, large texture games.

Caps to pop

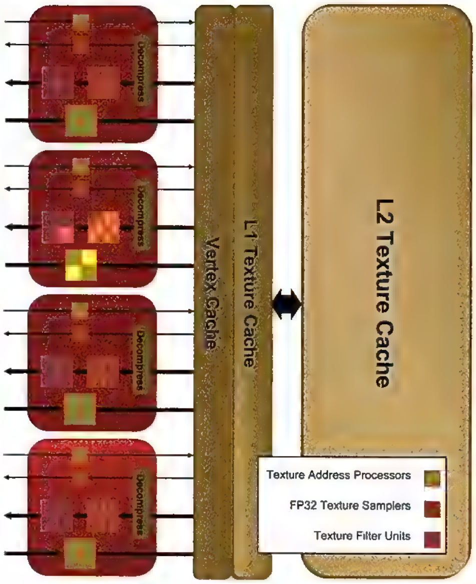
There is a grand total of three capacitors on the board, highly reducing the risk of them being torn off or causing problems.

This risk is reduced further by only two of these capacitors being exposed outside the heatsink.

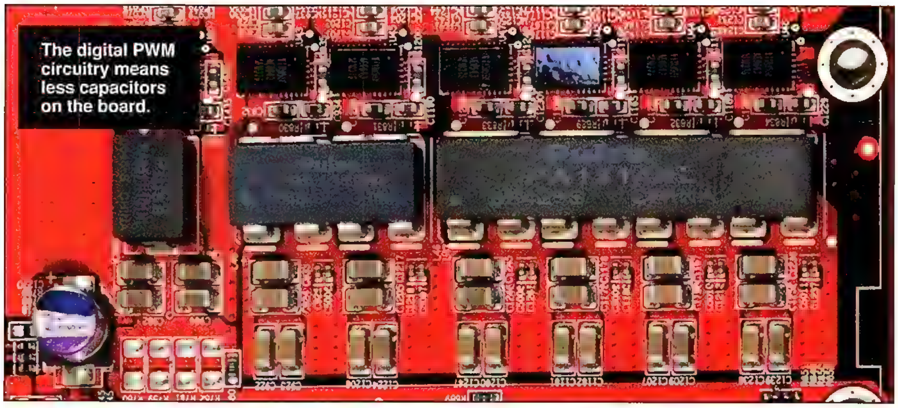
The secret behind this is digital Pulse Width Modulation, taking on the responsibility of power stabilisation to the core and memory and hence minimising the number of capacitors. This also has the run-on benefits of resistance to higher temperatures, higher efficiency and an easier to work with PCB.

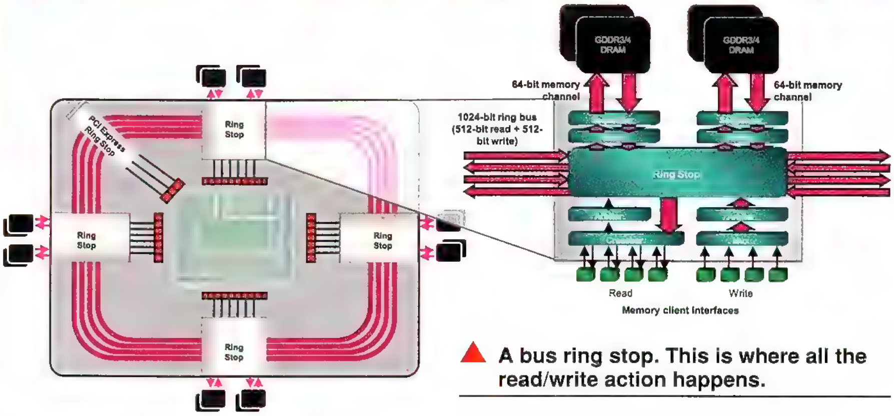

Branch Execution Unit
Stream Processing Units
General Purpose Registers

The stream processor block. There are 64 of these in the system containing five scalar units, leading to 320 stream processors in total. The thicker floating point unit on the left can handle extra operations like SIN, COS, LOG and EXP on top of the usual multiply/add instructions.


Decompress
Decompress
Decompress
Decompress
Vertex Cache
L1 Texture Cache
L2 Texture Cache
Texture Address Processors 🟫
FP32 Texture Samplers 🟥
Texture Filter Units 🟥

The texture units are more texture processors now, given what they're capable of.


The digital PWM circuitry means less capacitors on the board.


GDDR3/4 DRAM
GDDR3/4 DRAM
64-bit memory channel
64-bit memory channel
1024-bit ring bus (512-bit read + 512-bit write)
PCI Express Ring Stop
Ring Stop
Ring Stop
Ring Stop
Ring Stop
Ring Stop
Read
Write
Memory client interfaces

A bus ring stop. This is where all the read/write action happens.

Architecture

Of course just like all good DirectX 10 parts should, the HD2900XT supports Shader Model 4.0, complete with a unified shader architecture. ATI has had experience with this before in the Xbox 360's Xenos GPU – and so unsurprisingly this heritage comes through with the R600.

Much like NVIDIA's 8800 series, a thread processor is employed to manage exactly how the unified shaders and texture units are used. In this case AMD calls its solution the 'Ultra-Threaded Dispatch Processor'. This feeds a thread – consisting of vertices, polygons or pixels – through to the 320 stream processors present on the HD2900XT, arranged as four SIMD blocks containing 80 processors each. Two arbiters and sequencers are allocated to each SIMD block, reducing latency by being able to feed texture and vertex fetch commands into each, while preparing to push data into available stream processors. If a vertex or texture thread stalls, then whatever data the other arbiter holds can be pushed through instead, rather than having to go all the way back to memory. As such, latency is greatly reduced simply by being able to process a number of threads at once.

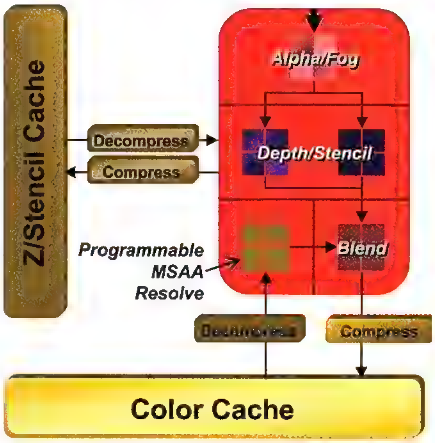
When finished the work hits the render back end units – or ROPs, as they're more commonly known – and eventually makes its way to screen.

At this point more astute readers will have picked up the 320 stream processors compared to NVIDIA's 96 on the GeForce 8800GTS. There are a few differences to point out here.

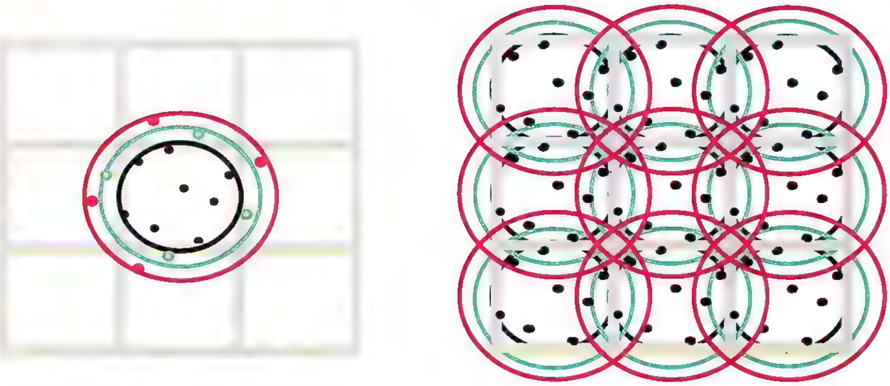
Firstly, NVIDIA's stream processors run on a separate clock. In the GTS this is 1.2GHz. AMD's solution on the other hand is tied to its core speed, meaning on the HD2900XT they're set to 742MHz – about 1.8 times slower. Still, it's not as simple as that. NVIDIA says it counts just standard ALUs, while AMD includes both standard and special function ALUs. By this measurement NVIDIA claims it would have double the shader units, at a significantly higher clock speed.

AMD on the other hand argues that as the whole card runs faster than the NVIDIA counterpart, overall communications should be quicker, that its architecture is lower latency, handles long shader instructions better – in fact only limited by memory size – and, of course, emphasises general purpose GPU (GPGPU).

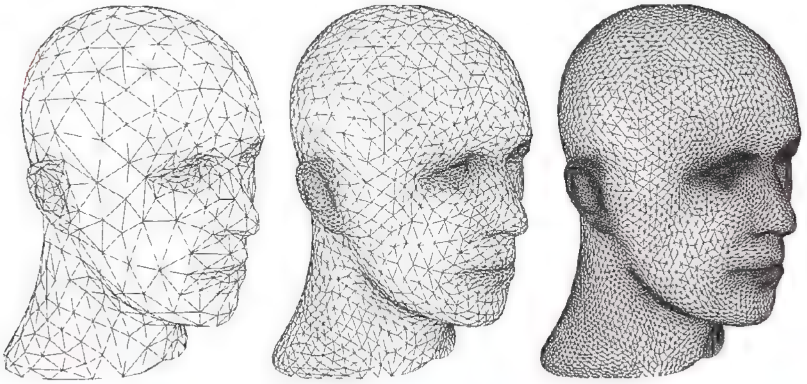
So as it stands with two radically different approaches, we'll simply have to let the benchmarks speak for themselves.


Z/Stencil Cache
Decompress
Compress
Alpha/Fog
Depth/Stencil
Programmable MSAA Resolve
Blend
Decompress
Compress
Color Cache

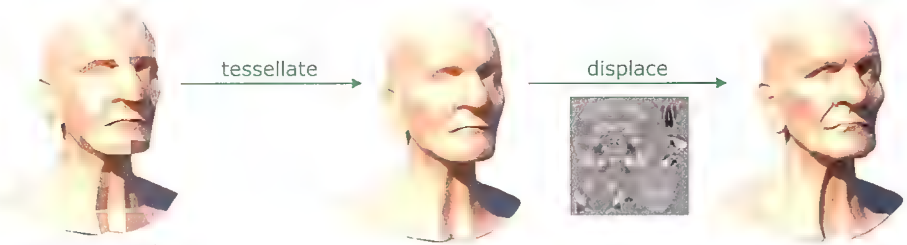
The render back end, or Render Output unit (ROP) of the R600. The addition of a new programmable multi-sample AA block is what allows CFAA.



CFAA allows the GPU to take programmable samples outside of the pixel border for greater AA flexibility. At the moment, it just makes things blurry.



[Zorin and Schröder,2000]



Model concept courtesy of Valve

The tessellating unit in the HD2900XT hints at a brilliant future for real-time 3D, assuming it makes its way into future revisions of DirectX.

Texture units

AMD has done some revising at the texture unit level, providing four units total with eight texture address processors, 20 FP32 texture samplers and four floating point texture filter units each, supporting trilinear and anisotropic filtering for all texture formats, of which it can support up to 8192 x 8192 pixels in size.

As a result of this power, AMD claims the HD2900XT can perform about seven times faster than the Radeon X1950XT when it comes to the filtering of textures. This should open the door for higher-level anisotropic filtering. This is a bonus, as the optional high-quality AF mode available in the X1k series is now the default and only option.

All aboard the memory bus

The HD2K series uses a 'ring bus' architecture, but this time has gone the whole hog over the hybrid crossbar/ring bus model seen in the X1K series. The internal ring bus has a thousand wires grouped essentially into four 256-bit buses, two going one way allocated to read, and two going the other way for write. This gives an effective full duplex bandwidth of 512-bits internally, and with eight 64-bit channels to local system memory this bandwidth is available externally as well.

Just like the previous architecture, the design allows requests to be sent around the ring bus to the nearest ring stop – if the data it's looking for is located on the memory connected to that stop, the read/write operation is carried out. If it scores a miss, then it moves along the bus until it finds the correct stop.

AMD claims the HD2900XT can perform about seven times faster than the X1950XT when it comes to the filtering of textures.

The previous ring bus iteration only sent read requests through the ring, whereas the write subsystem was situated in the middle of the bus, contributing to heat. Here, interface to PCIe is simply another stop on the ring.

Aunty Alias

As seems to be the case these days, new antialiasing modes have come along with the new architecture. Custom Filter Anti-Aliasing, or CFAA, allows the card to take custom samples outside of a pixel's boundaries. As the name suggests, it also allows customised antialiasing modes, available from the ATI Catalyst Control Center. At the moment there are only two filters available to choose from, Wide Tent and Narrow Tent, and both tend to make scenes a little too blurry. The idea is to be an extension to NVIDIA's unfortunately named Quincunx AA, introduced with the GeForce 3 and something that never really took off. AMD though has the advantage of being able to add potentially better custom filters as it goes – which is a good thing, as the ultimate result of AMD's current custom AA filters is that everything tends to look a little blurry. ATI tells us that game developers should be able to simulate the filters with DX 10 and beyond, but naturally due to hardware support using its solution should be faster. Given that devs are generally loathe to lock themselves into one bit of hardware, we can't see the support massively lining up behind this one.

Tessellating features, Batman!

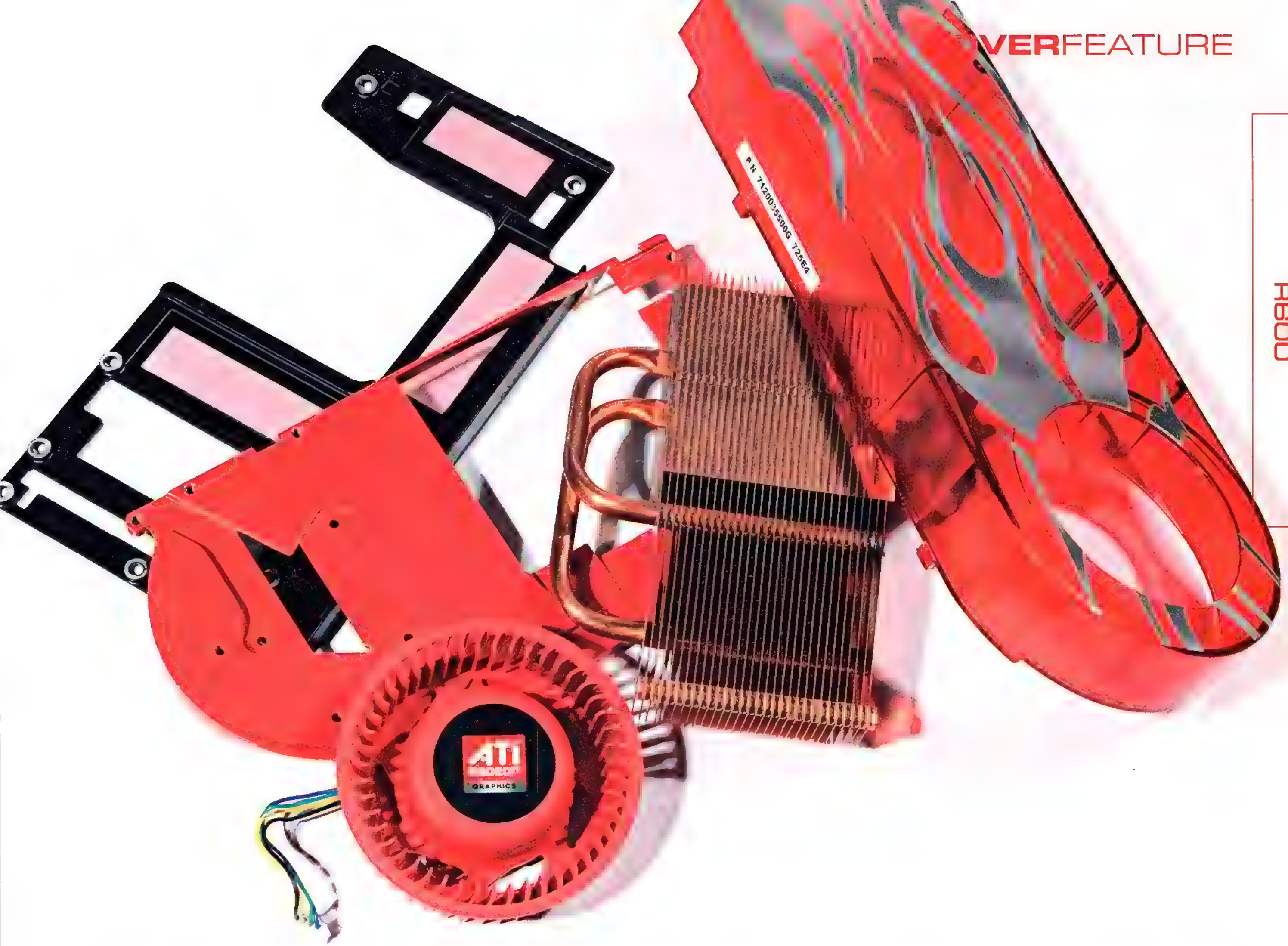
One thing AMD has drawn attention to is the tessellating abilities of its DirectX 10 family – which at first sounds like the Geometry Shader (GS) in another set of clothes. Or rather for those ancients who remember TruForm, a Phoenix-styled rise from the ashes.

Initially designed as a way to offer a GS-type solution to the Xbox 360 in lieu of DirectX 10 support, tessellation is a simple concept – a triangle can be sent to the card, then subdivided into two triangles, then those triangles can be subdivided further and further, a displacement map can be applied to exact height levels from the mesh and the net effect is a significantly more detailed model derived from a simple one. In a nutshell this greatly reduces the amount of vertices the CPU needs to send the GPU, with extra vertex generation done on the GPU itself, reducing bandwidth issues and allowing huge reductions in rendering time.

Where the tessellating unit differentiates itself from the GS is it's massively more powerful and better suited to subdivision of surfaces. The GS on the other hand is best applied to things such as deformation of surfaces and creation of incidental vertices and lines like adding hair to a surface.

This leads to the introduction of higher order surfaces that have been available in 3D modelling packages such as 3dsmax and Maya

AMD's DVI-to-HDMI dongle transports sound as well.



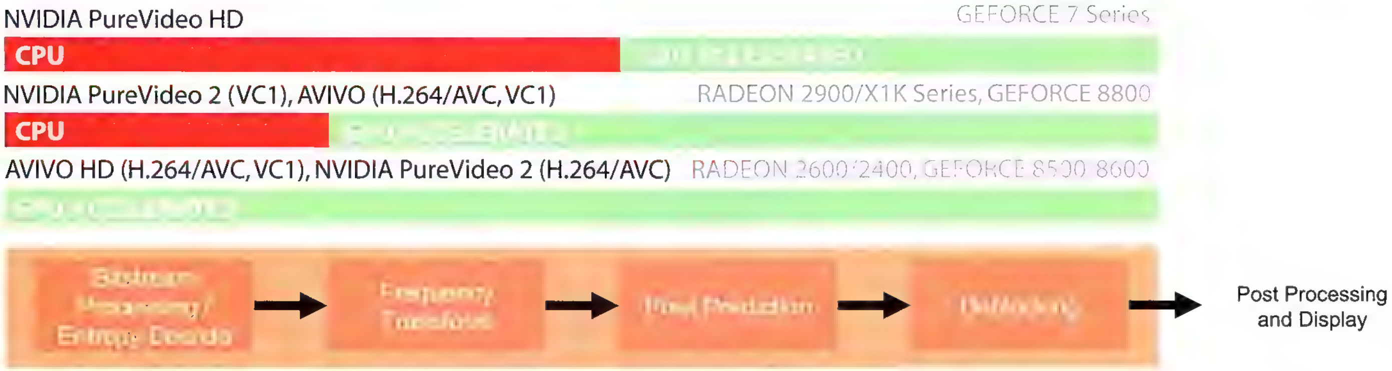
for a long time – Bezier patches, B-splines/NURBS/NUBS, N-Patches as well as Loop and Catmull-Clark subdivided surfaces – and it seems, whatever else developers may throw at it. In all, these are just fancy terms for different mathematical methods of applying a single 2D curve to a 3D surface to raise complexity via tessellation and achieve a new level of smoothness using only a basic dataset. In English, it means we can take a small amount of input data like a pyramid, and rather than having a straight line between the points we can make it curve however we like, with extra detail.

This also opens up the floor for dynamic tessellation, depending on point of view – meaning that low detail and high detail models are exactly the same, cutting down on 3D artist time. Different degrees of tessellation and hence detail can be applied depending on how close the player is to that object, achieving the same effect. Further down the track this could be potentially used as a performance boost for low-end graphics cards, dynamically adjusting the level of detail down to maintain fps where necessary.

Early Windows Graphics Foundation (the initial name for DirectX 10) documents reveal tessellation as an optional feature of the spec, and all suggestions lead towards it becoming a mandatory part of the next revision – we certainly hope so, as the advantages are huge. For now, AMD is making the tessellator available through calls to the vertex shader.

Sound pass

For us, this is the HD2900XT's defining feature and an indication of where AMD is heading with its future technology. The GPU features what is for all intents and purposes an audio pass-through chip, which pulls data from the sound chip on your motherboard. This is for one reason alone – to offer a full HDMI solution. A DVI-to-HDMI dongle is attached to the


NVIDIA PureVideo HD
GEFORCE 7 Series
CPU
NVIDIA PureVideo 2 (VC1), AVIVO (H.264/AVC, VC1)
RADEON 2900/X1K Series, GEFORCE 8800
CPU
GPU ACCELERATED
AVIVO HD (H.264/AVC, VC1), NVIDIA PureVideo 2 (H.264/AVC)
RADEON 2600/2400, GEFORCE 8500/8600
GPU ACCELERATED
Bitstream Processing / Entropy Decode
Frequency Transform
Pixel Prediction
Deblocking
Post Processing and Display

▲ **AVIVO HD completely accelerates the HD video decoding process, while older techniques still rely on the CPU to complete some operations.**

lower DVI port, and the card can now provide both audio and video through the one output.

The aforementioned dongle is an AMD special part only, included in the box – normal DVI-to-HDMI dongles don't expect a sound output and so will only give you video. It was mentioned that these special dongles should be available directly from AMD should you lose one, and we're crossing our fingers for a local system, or else we're stuck going to Canada just like we were for the internal CrossFire bridges.

Mind you this isn't all just good will on AMD's behalf – in order to comply fully with the HDCP DRM-infected spec, sound must not be made available through an insecure channel – i.e. the standard sound ports on your motherboard. Just one more data stream we lose to The Man.

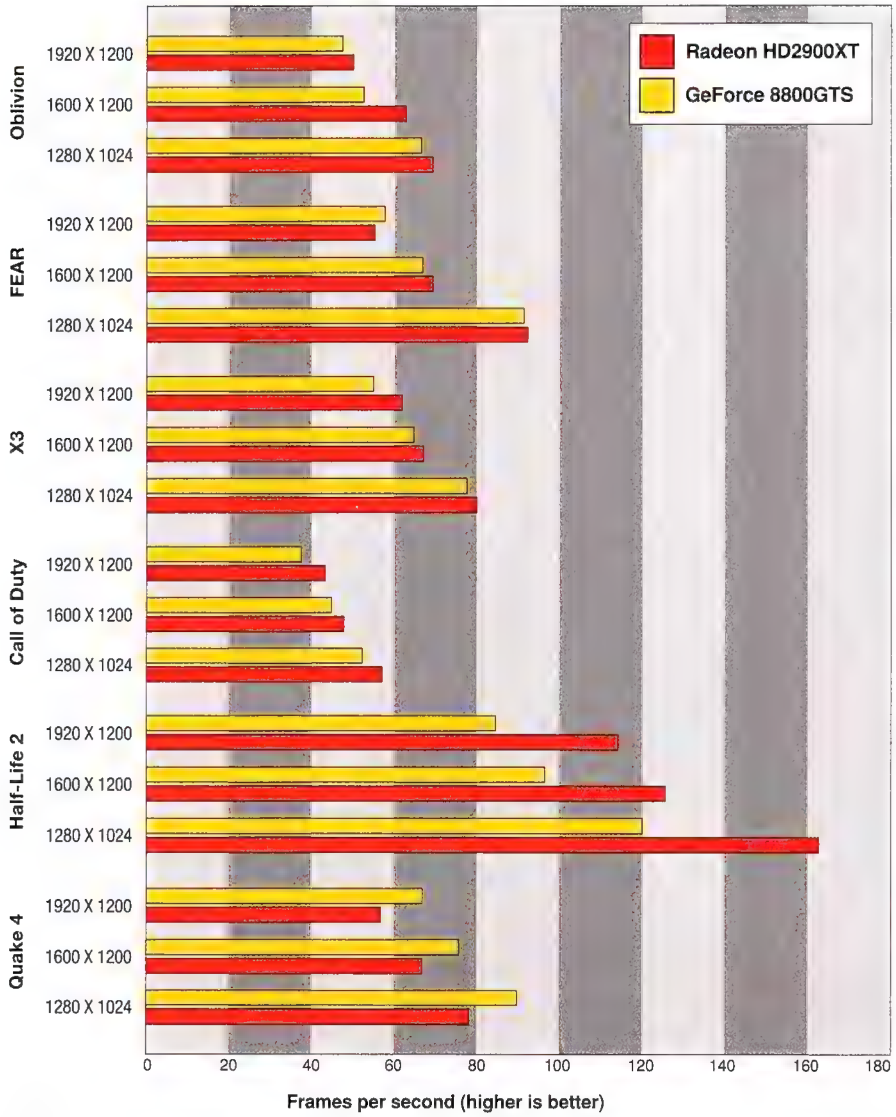
> **The fan never once spun up to a higher speed when overclocked to cope with the added heat – potentially a driver bug.**

The HD party

So what justifies the 'HD' prefix to the card's name, replacing the venerable 'X'? Well the previously mentioned HDMI dongle and audio pass-through for a start. Then there's the fact that both DVI ports should support HDCP content, not to mention that from the top through to the bottom of ATI's new range HDCP crypto keys are included in the ASIC, meaning that your card is guaranteed to play back HDCP content regardless of brand, unlike NVIDIA's 8600GT and 8500GT on which the inclusion of a crypto key is optional for the add-in board member.

Then there's AVIVO HD – which comes with a fancy feature called Universal Video Decoder (UVD). The UVD offloads the bitstream processing/entropy decode and frequency transforms from the CPU to the GPU in both H.264 and VC-1 streams. By comparison NVIDIA's 8600 and 8500 series with PureVideo 2 can only do this with H.264 streams at this stage – in VC-1 the bitstream processing/entropy decode is still done on CPU – while the 8800s can't do this at all as they feature an older revision of PureVideo.

Game benchmarks – GeForce 8800 GTS vs Radeon HD2900XT



This would all be a feather in AMD's cap – if the HD2900XT supported UVD. Much like NVIDIA's top parts, AMD's top of the line video card simply uses the same video processor found in the previous generation, relying on pure grunt to get it through, while leaving the newer, more effective technology to the mainstream cards that need the advantage to overcome the speed loss.

Admittedly if you have a high-end video card, there's a good chance you have a high-end CPU to make sure the GPU is fed satisfactorily, the combination of which will blitz any high-def content you throw at it – so this really isn't a big deal. The high-end cards from both NVIDIA and ATI handle playback of HD content just fine, despite the older technology included – the only people this will really affect are those who like to perform CPU intensive tasks in the background while watching a HD movie.

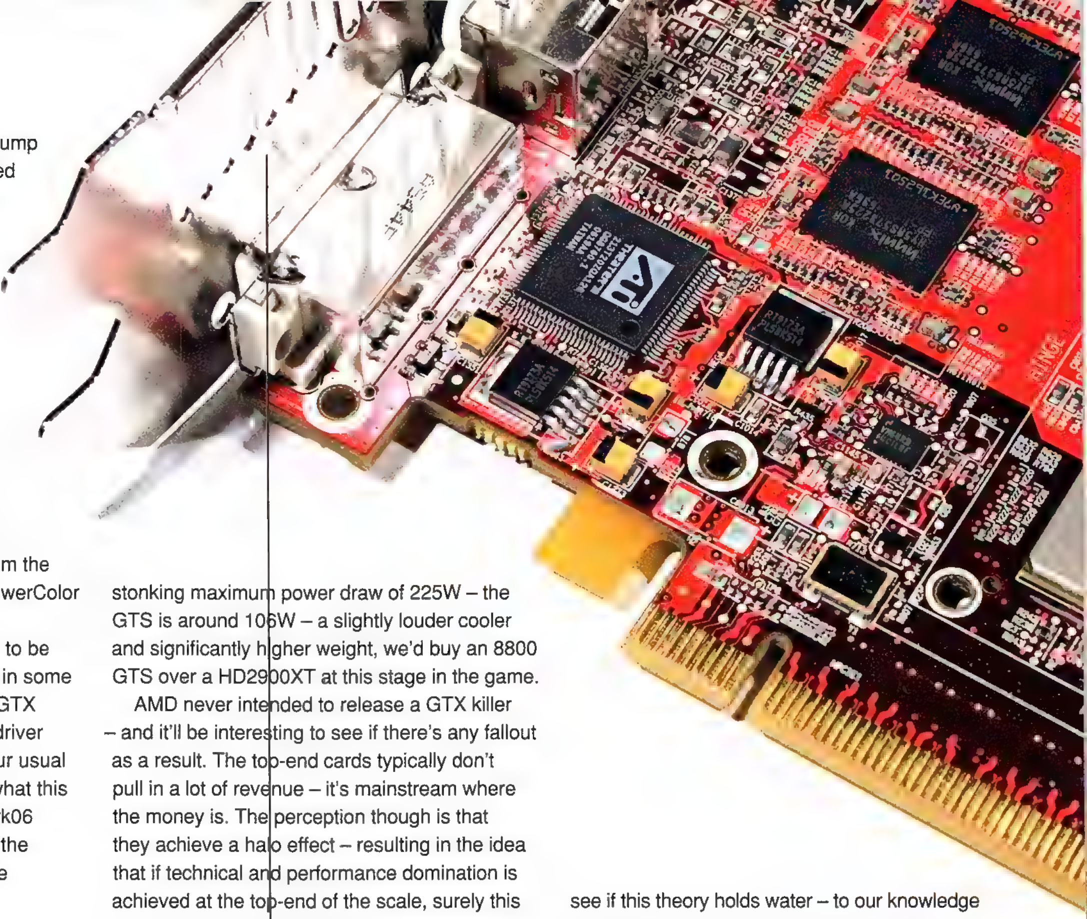
Noise

The new cooler is decently quiet during normal use, much better than previous ATI efforts, however it still howls like a banshee on heat when set to full power. In saying this it'll likely rarely hit this level – at the most, it gets slightly obnoxious after some punishing 3D work. For the quiet freaks out there you're better off sticking with the 8800 GTS or GTX, or investing in custom cooling hardware when compatible HD2900XT after-market parts hit the shelves.

Overclocking

Overclocking the HD2900XT apparently requires the eight-pin power connector to be, well, connected. It'll function just fine with two six-pins, but the overclocking options will be disabled.

Browsing into the Overdrive panel of the HD2900XT's Catalyst Control Center, we were able to achieve 858MHz on the core



and 1796MHz on memory – a massive jump from the 742/1650MHz stock. It appeared to be stable too despite our best efforts to abuse it in Half-Life 2. A worry though was that the fan never once spun up to a higher speed when overclocked to cope with the added heat – potentially a driver bug. Unfortunately ATITool doesn't currently work with the HD2900XT, so we were unable to force the fan speed and attempt higher clocks.

Benchmarks

The ever super-glowy happy people at Australia IT sent us an HD2900XT from the equally super-glowy happy people at PowerColor for testing.

Preliminary results showed the 2900 to be all over the place – just below the GTS in some benchmarks, and almost reaching the GTX in others. To this end, we waited for a driver revision (8.37.4.2) and then widened our usual benchmark set to get a picture of just what this enigma card was. Unfortunately 3DMark06 would not run at all, simply hanging on the splash screen – so we've stuck to game tests only.

Conclusion

As you can see using the existing driver set, the HD2900XT in most circumstances performs close to or under the 8800 GTS 640MB. Taking this into account and considering it has a stonking maximum power draw of 225W – the GTS is around 106W – a slightly louder cooler and significantly higher weight, we'd buy an 8800 GTS over a HD2900XT at this stage in the game.

AMD never intended to release a GTX killer – and it'll be interesting to see if there's any fallout as a result. The top-end cards typically don't pull in a lot of revenue – it's mainstream where the money is. The perception though is that they achieve a halo effect – resulting in the idea that if technical and performance domination is achieved at the top-end of the scale, surely this must filter down to the lower-end.

Of course this isn't necessarily the case, but the general public is a slow and ponderous beast, and if a simple statement is made that 'Brand X is the fastest', Joe Average typically tends to apply it to a full range regardless of fact. We'll be fascinated to see if this theory holds water – to our knowledge there has never been a deliberate attempt at not producing a competing card for the high-end since the ATI and NVIDIA war started proper.

Let's take a perspective check here though. For a start, the performance tests done here are DirectX 9 only – so the picture may change later on in the game with Vista, excluding any enhancements offered by drivers. DirectX 10 demos are now available – such as a Call of Juarez benchmark provided by AMD, or an NVIDIA-supported version of Lost Planet – however both are incomplete, buggy and are biased towards each vendor. As such we'll be waiting for a release-quality game or benchmark before providing relevant results.

The R600 architecture brings some fascinating ideas to the table (tessellation), and some welcome additions (guaranteed HDCP, sound over HDMI, and in the mainstream cards, UVD) that hint that in the next round R700 could be something special indeed.

For those in the market for a good value performance card, the HD2900XT is a decent offer – however in the performance stakes it is outdone in almost every avenue by the 8800 GTS. If the price is kept low enough, it could be a good solution. Those hunting for ultimate performance though don't even have to make a choice – the only answer is NVIDIA's 8800 GTX.

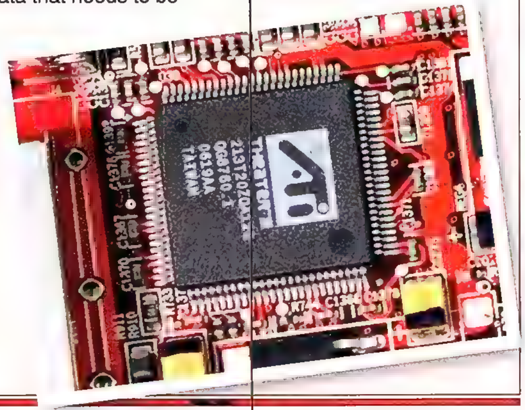
Now AMD, bring on the mainstream cards!

DECODING

Eh? What's this entropy decode we're talking about in regards to UVD? Basically when a video stream is encoded losslessly, information is thrown away. Entropy decode can rebuild this exactly using existing data, providing a video that is identical to the original before encoding.

Three common methods that can be used for entropy encode are Variable Length Coding (VLC is just basic compression – look for repeated datasets and reduce this to a smaller code – this is used in MPEG-2 and VC-1), Context Adaptive Variable Length Coding (CAVLC is where multiple coding schemes are used, with compressed elements bundled with the key used to encode – compatible with H.264) and Context Adaptive Binary Arithmetic Coding (CABAC is also used in H.264 and allows compressed elements to be stored as non-integers).

The second part UVD handles is Frequency Transform. If you read the codec feature in *issue 77*, this can often involve Discrete Cosine Transformation (DCT), a lossy form of compression. In layman's speak, when a video is being encoded, a given set of numbers are divided by a preset number, and that result is then rounded off to a lower level of precision to reduce the amount of data that needs to be stored – for example, a floating point number may be reduced to the nearest integer. During the decoding process Inverse DCT (iDCT) is performed, and a coefficient matching the earlier divisor is applied – the final result is close to the original number, but is not exactly it. The final image is close to the original but not perfect. Post-processing can be performed in an attempt to remove any errors introduced by the iDCT process.



SCORE
PowerColor HD2900XT
7.5
OUT OF 10

Game twe
spee

Why play a game configured for every system in the world, when it's playing on your PC? Logan Booker and Ashton Mills take a look at the big three games of today and get intimate with their consoles and configs.

Keeping up with the pace of new CPUs and video cards can be demanding on both the soul and wallet, but, if you want to truly enjoy a game at its greatest, the top hardware has to be there.

Or so one might think.

It's a well known fact among the enthusiast gaming community that all games come pre-configured to be as compatible as possible, as the developer has no guarantees as to what systems its game will end up on. This is mostly a good thing, as it means there's a high chance the game will just work when you load it. What makes it bad is that this high compatibility comes at the expense of speed, visuals and sometimes playability.

There's no way you'd run Windows, Linux, OpenBSD, Mac OS X or any other operating system (or hardware with overclocking headroom for that matter) stock, so why should the games you play be spared a bit of tweaking? The answer is they shouldn't, and we're here to show you how to get today's top three games – S.T.A.L.K.E.R.: Shadows of Chernobyl, Supreme Commander and Elder Scrolls 4: Oblivion – running at their best.

Of patches, drivers and hardware

Before we start looking at the games individually, there's a few things you can do across the board to improve your gaming performance. The first of these is to download the latest patch for the game in question. Along with bug fixes and new features, most updates include improvements to hard-coded systems such as the graphics engine or AI. In the next few pages, we'll quickly detail the fastest way to get the latest updates for each game.

The second step is to install the newest drivers for your motherboard, video card and operating system. Although performance gains from drivers are usually nothing to write home about, or even fire a quick email over, every little bit counts. Drivers are more for stability and compatibility

aks for d freaks

than anything else, and can remove problems such as graphical artefacts and the like.

Obviously the best upgrade you can make is via hardware, but this should be your last resort – unless you have a giant, Scrooge McDuck-like vault filled with coins that you're tired of swimming through. If you do decide to dip into that dusty barren wasteland you call a wallet and careful fish out a crusty tenner or two, be sure to take note of the following recommendations:

1 If your games take a long time to load, or you find that you have a smooth frame rate until you enter large environments filled with lots of players/textures, then you should look to buy either more RAM, or a video card with more RAM. These days we recommend at least 2GB of system RAM and 512MB of video RAM to play games such as Oblivion at their shiniest.

2 If you game plays fine until you head into an open environment with lots of textures, where it seems to chug at a consistent speed, then you'll definitely want to look into a video card with more RAM – at least 512MB.

3 If you find your game chugs, no matter the resolution or texture detail, then your CPU is at fault. Try to grab something with at least two cores (purchasing a single core processor should actually be a bit difficult these days) and branded 'Core 2 Duo', as Intel continues to hand AMD its derriere.

Alternatively, if it plays fine until you really bump up the texture detail and resolution, you may just need an up-to-date graphics card. Again, something with 512MB is the way to go, and if you can manage it, an Radeon 2x00 or GeForce 8x00 series board is recommended for DirectX 10-compatability (once the games finally arrive).

With these basics covered, let's move onto the games.

SUPREME COMMANDER

No doubt, fans of Chris Taylor's original Total Annihilation will be well on their way to completely mastering his latest game. But mastering the frame rate? That's another question entirely, and one we'll handily, er, handle here.

Quad squad

Supreme Commander is one of a new breed of games that takes full advantage of multi-core CPUs. The benefit you will gain from a dual-core processor over a single-cored one cannot be overstated. If you have serious plans to play SC until your bones are brittle, white stalks and everyone you once knew and loved is dead, invest in a Core 2 Duo or Athlon 64 X2 – whatever your current budget and platform limitations allow.

Our benchmarks in *issue 72* showed that Supreme Commander's frame rate improved by 50% going from one core to two, 30% from two to three and 10% from three to four. Considering this made the game go from an unplayable 19fps to an extremely smooth 56fps, with eight AI players going full-pelt, it's clear that quad-core has its place in gaming and will only increase in importance as time goes on.

Supreme Commander demands a lot from your CPU, so one with two or more cores can make a huge difference.

Patch information

Developer Gas Powered Games included its own multiplayer matching service, called GPGNet, with the release of Supreme Commander. If you have an account (it's free, so go for it) you can just load up the GPGNet software, log in, and it will detect if you have the latest version and update as necessary. This will also keep the GPGNet client itself up-to-date.

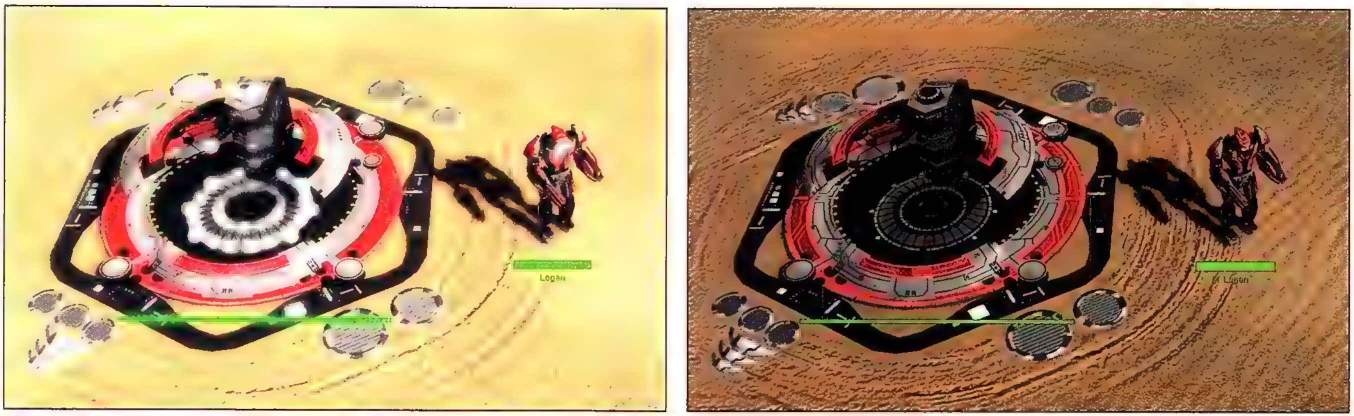
If you want to dispense with such complications, patches are available from the usual mirrors. Counter-intuitively there's no downloads page on the official site (**www.supremecommander.com**). In fact, the only way outside of file mirrors to get patchs is via publisher THQ's support page: **nfo2.thq.com/support**. At the time of writing, the latest update was version 3220. As there are no drawbacks to updating, unlike S.T.A.L.K.E.R., we suggest grabbing the latest patch be your first step before following the rest of the guide.

The shadow?!?

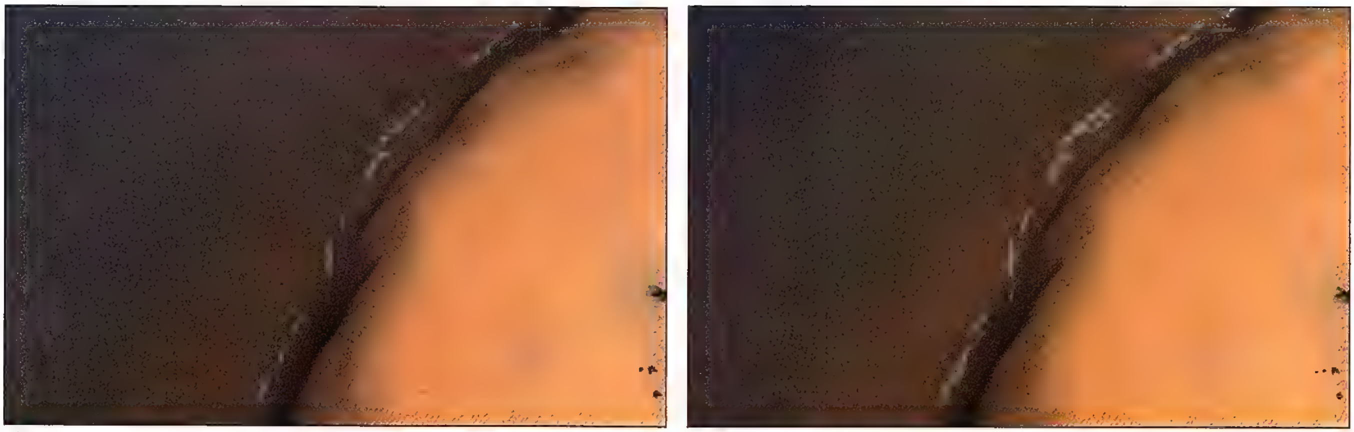
Yes, unit shadows. Turn them off. All of them. For years shadows are still the number one cause of crippled performance in games, and Supreme Commander is no exception. Unless you're running space age GeForce 8800-like hardware, just send those black blobs home. If you're lucky, this alone will give you a playable frame rate and you won't have to mess around with other tweaks.

Consolitis

Gas Powered Games decided it'd be a great idea to include a console in SC to make tweaking it just that much easier. Although the number of commands that make a noticeable change in performance without destroying the visuals are far and few between, we did manage to scrounge up a setting or two that will make a difference. To access the console, tap the tilde (~) and a small window should appear in the top left corner of the screen.



Left shows bloom on, but it's a personal taste thing, we actually think it looks better with bloom off (right).



Water detail turned on (left) and off (right). On water-heavy maps, having water off is a surprisingly effective tweak.

ren_bloom Flick this sucker to zero to turn off bloom effects. Sure, they're pretty, but they can adversely affect performance when you have a lot of big and very shiny robots on screen at once.

ren_skycube Removes the flat texture of a planet that appears when you zoom all the way out and replaces it with flat black. This should provide a minor performance increase while in this mode.

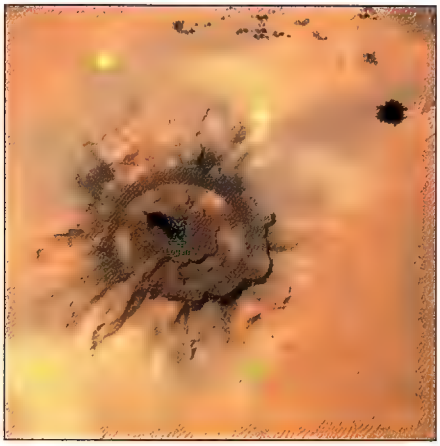
ren_water On land-based maps, this won't help that much, but when there's H_2O all over the place, switch this off. It'll remove the shader effects for water and as long as you stay in a roughly top-down view of the battle you won't notice your ships hovering in mid-air. Can provide a sizeable frame rate boost.

cam_free This one you can use at your own risk. It removes the construction progress bars that appear over units and buildings and can hand back a few frames of performance. We don't recommend it as you'll lose a bit of situational awareness, but you're free to try it.

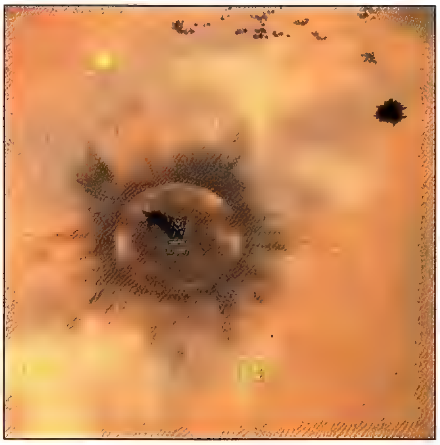
ren_fx Depending on how zoomed out you spend most of your games, this will either make no visual difference at all with a huge performance gain, or leave you wondering where all the supreme went out of Supreme Commander. Special effects such as gun blasts and laser beams will be removed if this is set to 0 but during heavy fights it's a massive boon to frame rates.

ren_decals, ren_normaldecals, ren_splats: These three commands tweak texture decals, including explosion marks, craters, bullet holes and all the purely aesthetic art that some of the buildings have around them.

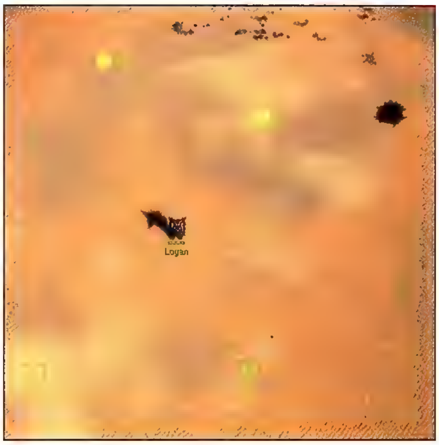
ren_decals will remove all decals in the game, ren_normaldecals will remove mostly the terrain bump mapping effects but keep the glitz on buildings while ren_splats just removes marks caused by munitions and other deformation effects.



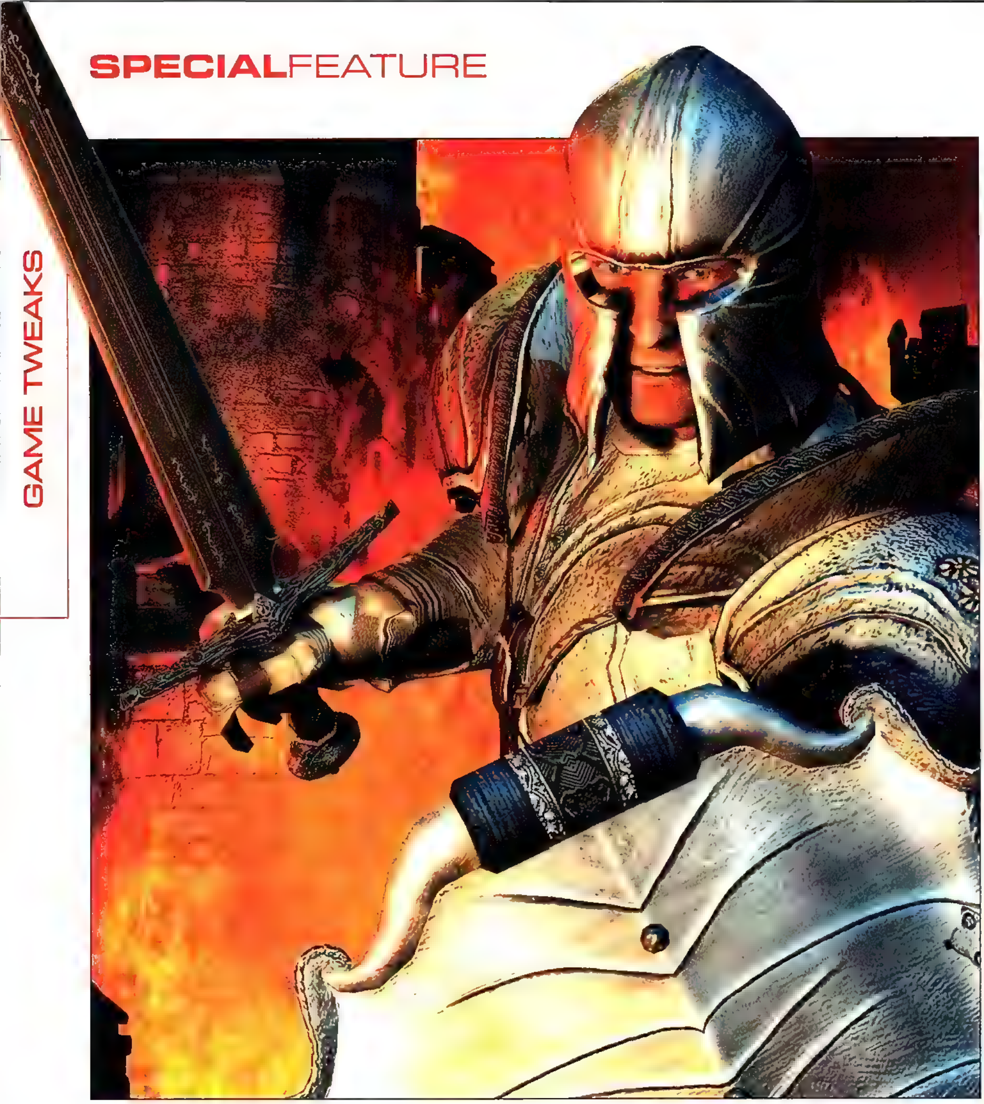
The unaltered scene, soon to be altered!



With ren_normaldecals set to 0.



With ren_decals set to 0.



Elder Scrolls 4: OBLIVION

Going strong after a year thanks to the community of user-made mods, Oblivion is still a strikingly beautiful game... and a performance hog. The advent of the GeForce 8800 has diminished this somewhat, but not everyone can afford one, and regardless of your hardware a smoother, slicker game is always a good thing to have.

Here's how to get the Oblivion beast tamed for your system, and in the process get it up to date as well.

Performance tweaks

Atomic released the first Oblivion Optimisation guide on **www.atomicmpc.com.au** that became hugely popular. Ironically, the official 1.2 patch makes much of these tweaks moot now – indeed, 'optimised' configs appear to run worse with 1.2 than a clean 1.2 generated INI file. Still, there are some tweaks to be made.

- Start with a clean INI file – delete 'Oblivion.ini' from your 'C:\Documents and Settings\Administrator\My Documents\My Games\Oblivion' in XP or 'C:\Users\[User Name]\Documents\My Games\Oblivion' in Vista.
- Start the game from the launcher, and set up your graphics options.
- Load the game and go into the Video and Sound properties, then setup the game to suit your preferences. Make sure 'Shadows on grass' and 'Shadow filtering' are off. Quit the game.
- Open up the newly created Oblivion.ini in your favourite text editor.

Now, make the following changes:

iMinGrassSize=120 This reduces grass density, one of the single biggest gains for performance from INI tweaking.

TreeClonesAllowed=5 Allowing more tree clones means you'll see more duplicated trees, but forests render faster as a result.

uGridDistantCount=15

uGridDistantTreeRange=10 These two lines will reduce the density of far trees and objects, and again further improve rendering speed.

bUseThreadedBlood=1

bUseThreadedMorpher=1

bUseThreadedTempEffects=1

bUseThreadedParticleSystem=1

Questionable impact, but single-core and certainly dual-core can benefit from the threaded system.

iThreads=9 Similarly, boosting the number of threads can possibly improve performance, but too high a value would certainly impact it adversely as well.

bAllow30Shaders=1 If you have an SM 3.0-capable card, this certainly won't hurt.

bMusicEnabled=0 Unless you really like the music, disabling it seems to improve performance quite nicely.

SIntroSequence= Blanking this line will get rid the bazillion intro videos that appear before the game proper starts.

iMaxDecalsPerFrame=999

fDecalLifetime=1800.0000 Er, these aren't performance related but give you more blood and makes sure it stays around longer. What? Doesn't everybody want this?

Patch information

Although a long time coming, Bethesda recently released the new 1.2 patch in anticipation of Shivering Isles, as apparently some new functions needed to be added to support the expansion. In the process Bethesda greatly improved the background loading engine – considerably, in fact – and as a result gameplay is *much* improved over Oblivion 1.1. The 1.2 patch even improves Level of Detail (LoD) graphics, negating the need for texture-heavy LoD mods. Note that there are a few caveats:

- Installing Shivering Isles also updates the game to 1.2, but confusingly the subversion number (and presumably, included fixes) bundled with Shivering Isles is less than the stand alone 1.2 patch. Additionally, if you install Shivering Isles first you can't install the latest 1.2 patch over the top – the installer won't let you. The solution is to install the 1.2 patch first, then Shivering Isles – it won't overwrite it with the one from Shivering Isles as it sees the patch as already installed.
- Shivering Isles has a serious bug that corrupts save games after a number of hours just by having Shivering Isles installed, even if you're not visiting the new realms. At the time of writing Bethesda has released two 'beta' patches to fix this. By the time you read this a final patch should be out. Make sure you grab this latest version. To do so, head to the official site at **www.elderscrolls.com.**

bAllowScreenshot=1 So you can pose to your pals. Press Print Screen in-game.

You may remember some of the more popular tweaks doing the rounds, including in the *Atomic* guide, were to alter the **uExterior Cell Buffer** and **iPreloadSizeLimit** to larger values.

However post the 1.2 patch these are two settings where the default values seem to give better performance if left alone. So resist the urge to bump them, and stick with the defaults here.

Performance mods

Much has already been done to improve the performance of the game through mods – everything from optimising meshes and models through to mods that tweak gameplay settings on the fly. Some increase performance with no visual or gameplay loss at all, while others gain even more performance by reducing the quality of the game.

All of the following improve performance with no loss in game visuals or mechanics, and are highly recommended. Head to Planet Elder Scrolls (**www.planetelderscrolls.com**) and TESSource (**www.tessource.net**) and grab the following:

- Lowpoly Grass
- Short Grass
- Oblivion Polygone Overhaul
- Quiet feet (if you have onboard sound)
- Operation Optimization
- Streamline

Install all of these, with the exception of 'Quiet Feet' unless you have onboard sound; when many creatures are nearby the buffers can overwhelm onboard sound systems, and this mod greatly reduces this. Users with Sound Blaster et al need not worry.

Definitely make sure you get 'Streamline', which former *Atomic* editor Ashton Mills helped develop. Finally, if you have a card with less than 256MB, 'Wiseman's Reduced Textures' helps greatly by relieving the pressure on 3D texture memory.

It should probably go without saying – which therefore means we need to say it – but once you've installed the 1.2 patch, Shivering Isles if you have it, performance mods and any gameplay mods (especially if texture-based) – defrag your drive. No doubt file fragments will be all over the place. Defragging really does make all the difference.

Don't forget to head to the official Oblivion forums at **www.bethsoft.com/bgsforums** for the latest on the game and user-made mods.

We're guessing he might be hungry.

Must-have mods

Where do we begin? There are over 14,000 mods for Oblivion and a good chunk greatly improve the game far beyond Bethesda's vision. Here's a selection of some of the bigger or more popular ones to get you started:

Visual
Qarls Texture Pack III
Unique Landscapes
Harvest Containers
Realistic Flora
Illumination Within Optimised
Tamriel NPCs Revamped (TNR)
Natural Environments
Darnified UI
Improved Facial Textures
Beautiful People

Gameplay
Unofficial Oblivion Patch (aka the UOP)
Oscuros Oblivion Overhaul (OOO)
Martigen's Monster Mod (MMM)
Realistic Physics and Force
Mighty Magick
Cats and Rats
Tamriel Travellers
Kobu's Character Advancement
Deadly Reflex

All of these, as well as the mods listed in the performance section, can be found on Planet Elder Scrolls (**www.planetelderscrolls.com**) and TESSource (**www.tessource.net**).

Tweaks will bring your horse up to a fine polish too

S.T.A.L.K.E.R.: Shadows of Chernobyl

S.T.A.L.K.E.R., essentially the sci-fi version of Oblivion, has proved a favourite with FPS fans who aren't into the heavy RPG flavour of Bethesda's monster game. Although it enjoys the magical touch of crazy Eastern European studio GSC Gameworld, the game has suffered from a drawn-out development. Luckily for us, there are a few things we can do to make our ride in the exclusion zone that much smoother.

Vista sucks?

For S.T.A.L.K.E.R. it does. The change from Windows XP to Vista itself causes a drop in performance, thanks to the change in the graphics driver model. Denied direct access to the kernel and hardware, lower frame rates are inevitable. This problem is accentuated in S.T.A.L.K.E.R., so if you have a copy of both Windows Vista and Windows XP, it might be a good idea to set-up a dual-boot system. Heck, it's not a bad idea to dual-boot for all your games, at least until Microsoft, NVIDIA and AMD get their acts together and release Vista drivers that are up to par with the maturity of their XP brethren.

Patch information

Currently S.T.A.L.K.E.R. has seen a paltry two patches, and neither has taken great leaps at improving the speed of the game. Regardless, you should make sure you're running the latest version as the updates do fix numerous bugs with the singleplayer and (mostly) multiplayer.

The best source for the latest patch is the official website's download section, which can be found here: **www.stalker-game.com/en/?page=patches**

The links on this page however simply redirect to common file mirrors in the States and may not provide the best speed. Australian mirrors for the patch can be found at Internode, AusGamers and numerous other ISPs and gaming sites: **www.ausgamers.com/files/details/html/28381** **games.internode.on.net/filelist.php?filedetails=7877**

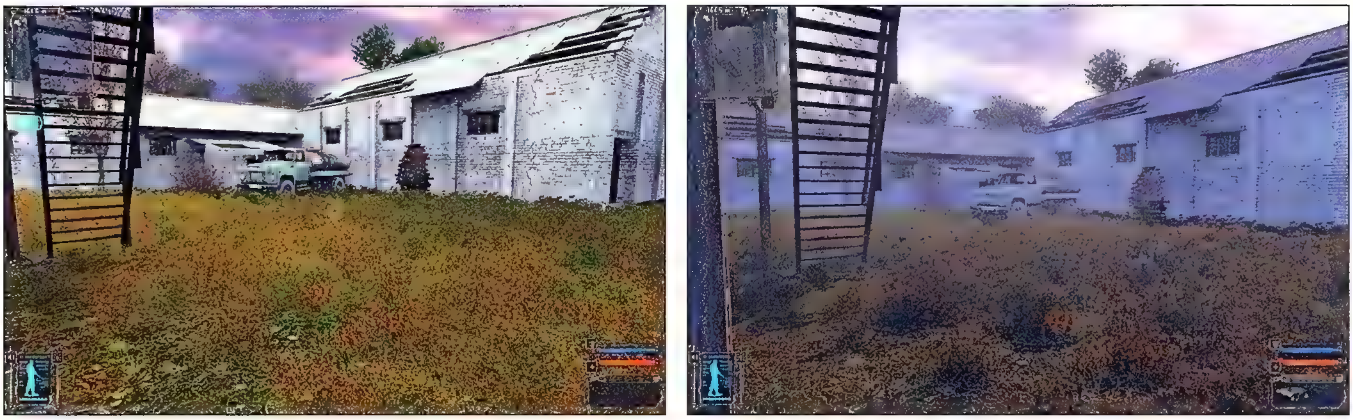
Note that these links go to the incremental 1.3 update, and you'll need to have the 1.1 patch installed to use them. Saved games are not compatible between versions 1.0 and 1.1, but they are for 1.1 and 1.3. So, if you're just looking for speed improvements, are running 1.0 and have a saved game that's some way into the game, don't bother with the patches unless you're prepared to start over.

For everyone else, download and update!

Tale of two renderers

From a technical perspective, S.T.A.L.K.E.R. is very unique. Unlike the other games we've looked at in this guide, S.T.A.L.K.E.R. comes with two rendering engines – one for DirectX 8.1 and another for DirectX 9.

When S.T.A.L.K.E.R. began its development over six years ago, DirectX 8.1 was one of the latest 3D APIs available and had a formidable feature set. These days, it's not that hot. Having worked on a DirectX 8.1 renderer for so long, developer GSC Gameworld would not have



▲ **We featured these shots in *issue 76* to illustrate the difference between S.T.A.L.K.E.R.'s two renderers. On the left is DirectX 8.1 and the right DirectX 9. The lost of bloom, the sun as a light source and global illumination in DX 8.1 really kills the mood, but at least it doesn't kill your frame rate.**

been keen to drop all that work when the powerful DirectX 9 API arrived. So, it started on a DirectX 9 renderer, and both are included in the final release of the game.

Due perhaps to increasing pressure from publisher THQ to get the game done, the DX 9 renderer did not receive the same level of attention as DX 8.1 and as such will slow even the most beefy of machines to a crawl. Add to this a memory leak with the DX 9 renderer, something we've confirmed during the writing of this article, and the renderer is not only incredibly resource hungry, but produces erratic frame rates at the best of times.

If you find yourself tearing your hair out trying to tweak the DX 9 renderer to make it playable – don't blame yourself. Just switch to the older DX 8.1 pipeline and enjoy the game. Sure, you'll miss out on high dynamic range lighting and some fancy effects, but the game itself is still there and, we're happy to say, the DX 8.1 renderer is very mature and stable.

To change between the rendering modes, simply head over to the video settings in the game's startup menu, and from the renderer dropdown box select one of the following:

Full Dynamic Lighting DirectX 9 in all its glory. If you're not running an uber machine, this will kill it.

Object Dynamic Lighting Again, the DirectX 9 renderer is used, but only on objects. Global illumination is disabled in this mode. We found that this didn't provide that great an improvement in performance and we were better off just tweaking the first mode.

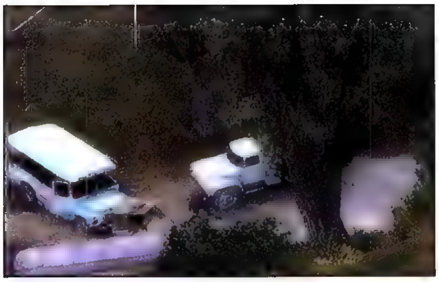
Static Lighting The DirectX 8.1 renderer. It works, looks fine, and you shouldn't need to tweak anything unless your computer hails from the Bronze Age. If you're still having performance issues in this mode, just buy a new PC. Seriously.

All in the console

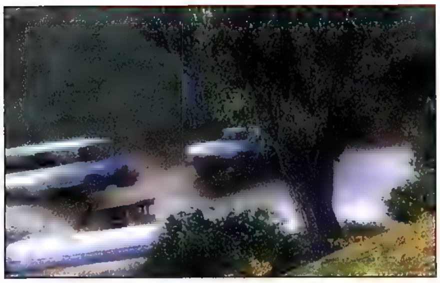
Most first-person shooters, especially id's Quake series, come with a command console. S.T.A.L.K.E.R. is no exception. A simple tap of the tilde (~) key will bring the blighter sliding down from the top of the screen, and from here you can change a number of variables related to the AI, sound and graphics subsystems. For our purposes, we'll be focusing on the graphics-related variables of 'cvars' as they called. Keep in mind that most of the important options are available via the advanced video section of the startup menu.

To make use of the following, just type them into the console. For a few to take effect, you'll need to use the 'vid_restart' option to reset the renderer. Thanks to the memory leak with the DX 9 renderer, you may need to type this in a number of times to see if your frame rate has improved.

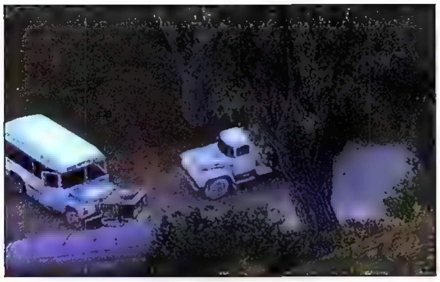
Settings that begin with 'r2' relate to the DirectX 9 renderer; just an 'r' for the DirectX 8.1 renderer; and those with 'r__' are applicable to both. We've also included a



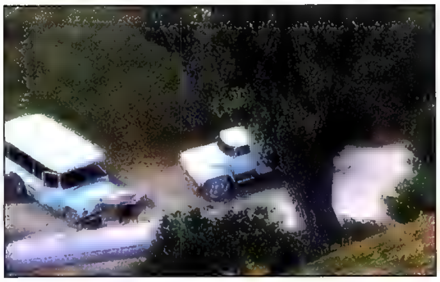
An in-game shot using the DirectX 9 renderer on maximum quality. All is good and well, except for the giant radioactive reactor nearby.



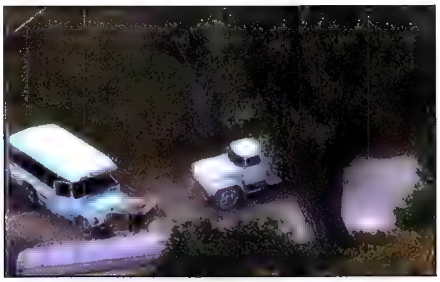
Of the settings we played with, having object and texture details on their lowest settings made the most visible difference. Duh.



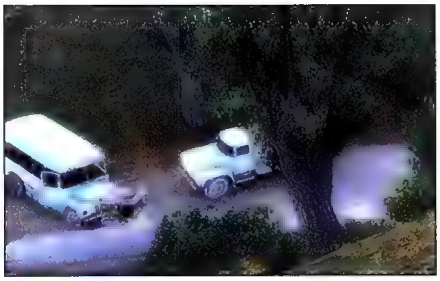
With bloom off, it looks like a different game. Notice that the soft edges around the trees and vehicles have disappeared.



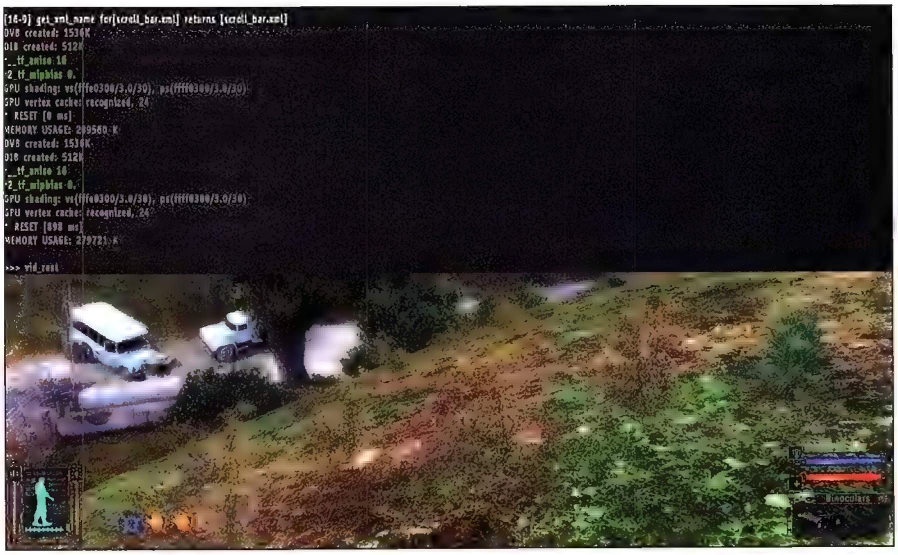
Viewing distance set to nothing, the game looks fine – at least from this shot. Scenes where you can look a fair way into the distance will be muted.



Lighting distance on minimum. Light from muzzle flashes won't appear at a distance, but the frame rate improves quite a bit.



Sun off. Gone are the soft golden highlights and detail on the grass. You'll also lose the sun as a moving light source.



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[16-9] get_xml_name for[scroll_bar.xml] returns [scroll_bar.xml]
DVB created: 1536K
DIB created: 512K
__tf_aniso 16
2_tf_mipbias 0.
GPU shading: vs(fffe0300/3.0/30), ps(ffff0300/3.0/30)
GPU vertex cache: recognized, 24
* RESET [0 ms]
MEMORY USAGE: 289560 K
DVB created: 1536K
DIB created: 512K
__tf_aniso 16
2_tf_mipbias 0.
GPU shading: vs(fffe0300/3.0/30), ps(ffff0300/3.0/30)
GPU vertex cache: recognized, 24
* RESET [898 ms]
MEMORY USAGE: 279721 K

>>> vid_rest
```

The console of power. Well, the console for S.T.A.L.K.E.R. You can bring up a list of editable cvars by typing in 'help'.

Must-have mods

S.T.A.L.K.E.R.'s modding community is still very much in its infancy, but that doesn't mean there's nothing for you to try.

Float32: **www.thefloatingpoint.org/main/download.php?list.4**

The latest version of this mod can always be found at the URL above. Or, for the main site with news and information check out: **www.thefloatingpoint.org/main/news.php**.

This mod includes performance and visual optimisations for the X-Ray Engine, the tech behind S.T.A.L.K.E.R., and can improve frame rates by up to 20%, depending on your hardware while also looking sexier. Make sure you read the readme_1.txt file that can be found in the game's root directory after the mod is installed, as it explains a few configuration file changes that need to be made before the mod can take effect. Note that the mod currently isn't compatible with ATI cards.

Azzer's 10-Day Quest mod: **hosted.filefront.com/altairstalker**

This is a gameplay tweak, and increases the amount of time you have to complete one-day quests to 10 days. Player's choice as to whether they want to install it.

few of the options from the video menu you can tweak:

r2em By default, this is set to 2.2, but can be changed to 0 through to 4. Increasing this value lowered frame rates by a noticeable margin, and setting it to 0 provided a healthy boost. In all our testing (and short of switching to the DirectX 8.1 renderer) this was the best tweak we found. We also couldn't see any change in visual quality.

> S.T.A.L.K.E.R.'s modding community is still very much in its infancy, but that doesn't mean there's nothing for you to try.

r2_sun Provides the sun as a light source, and can be set between 0 or 1. Seeing as the sun moves around and affects everything you see, it can severally impact performance, especially if you have the grass density set high. While turning this off will make a perceivable difference, the frame rate gains can be well worth it. Alternatively, you can disable just the setting below if losing the sun is to much to bear.

r2_sun_details While it removes sun lighting detail from a number of objects, you'll notice it the most on the grass. Lighting all those sprites is actually a resource-intensive activity, and turning this off can quite possibly allow you to have sun lighting without the frame rate hit. Another compromise is to lower grass density, an option found in the advanced video menu.

r2_gi Only for the hardcore, global illumination makes the world even more beautiful. Artefacts will cast their own light, and important details such as reflection, absorption and the like will be taken into account for light sources. As one might expect, it's an absolute killer on the frame rate, but if you think your system is up to scratch, the next tweak is aimed at you.

r2_gi_photons Set this to 64, going lower will axe frames while intensifying 'glow' effects, and going higher has the opposite effect. In testing, we found that going any higher made global illumination almost unnoticeable (and therefore pointless), while going lower made things look better at the expense of frames we weren't willing to lose.

r2_ls_bloom_fast Set to 0, this will deactivate bloom effects. This also disables the feathering effects around sprites such as trees and fences, but if your graphics card is a bit behind the times, this can provide a health boost in performance.

r2_zfill Default is 0, 1 is on. Mixed results with this bad boy. Can improve performance on some configurations, if you can put up with Z-buffer artefacts – texture shimmering and shearing and objects that can't seem to decide whether they're behind something or in front of it. These are all purely visual problems however. Tweaking r2_zfill_depth (.001 to .5) can minimise or accentuate the problem.

NPC flashlights While you can do this from the console it's a lot easier to do from the video options menu. This can impact hugely on performance in night scenes with lots of people running around with torches on their helmets. The disadvantage is that they might be harder to see coming. The frame rate improvement more than makes up for this.

Lighting distance Again with a bit of fart-arsing you can manipulate the values for the lighting in the console but, even with our expert skills at work we found the same results can be obtained with the slider in the options menu. Setting this to the lowest setting made surprisingly little difference to the game. You'll miss out on seeing muzzle flashes and strikes of lightning at a distance, but you'll still get them up close so it's not a great loss.

Viewing distance Using rs_vis_distance you can change the viewing distance of NPCs, trees and buildings between values of 0.4 and 1.5. We found a happy medium at 1 and 0.9. You can set this via a slider, but through the console you get much finer control. Play around with this setting until you're happy with the performance gain.

Object detail r__geometry_lod, r2_ssa_lod_a and r2_ssa_lod_b control the level of detail of objects in the game but again, the object detail slider in the video options menu provides all that you need. Play around with this setting from half-way to just below max until you find performance you can live with. We found that about two notches below max was the sweet spot.

Texture detail Depending on how much memory you have on your video card, you'll either need to give this a lot of attention or none at all. If you have less than 512MB of video RAM and 2GB of system RAM then slide this down to three-quarters. Suffice it to say, on its lowest setting everything will be one giant smudge.

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HARDCORE

NEWS, REVIEWS AND ROUNDUPS ON THE LATEST HARDWARE

Yes! R600 is here! Flip back a few pages to catch all the action on what is undoubtedly a very interesting card indeed. It's also a hot, heavy, power-hog of a thing, but interesting nonetheless.

P35 is here, being the replacement for Intel's P965 boards, and while bringing Penryn support, by and large not much has changed since the last generation.

The usual stuff follows, including one insane GeForce 8800 GTX Ultra, a royal rumble of the world's most popular Linux distros, and Dan Rutter's amazing flying machine. Er, column.

HARDCORE CONTENTS

How we test 40

Head to head: Linux distros 42

Which Penguin suits you?

Gearbox 50

Metal Gear Solid Box.

Kitlog 60

Atomic log, stardate... er... 78.

Ground Zero 62

Dan's hard drive keeps him up at night.

Hardware reviews

P35 motherboards:
- ASUS P5K
- ASUS P5K3
- Gigabyte P35-DQ6
- MSI P35 Platinum 52

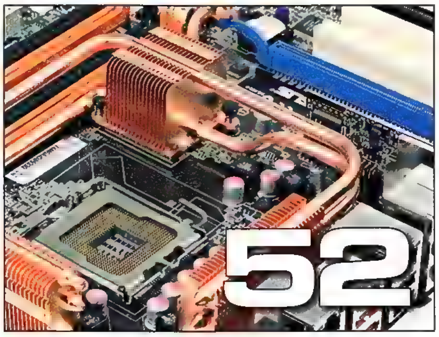
ViewSonic VX2835wm 56

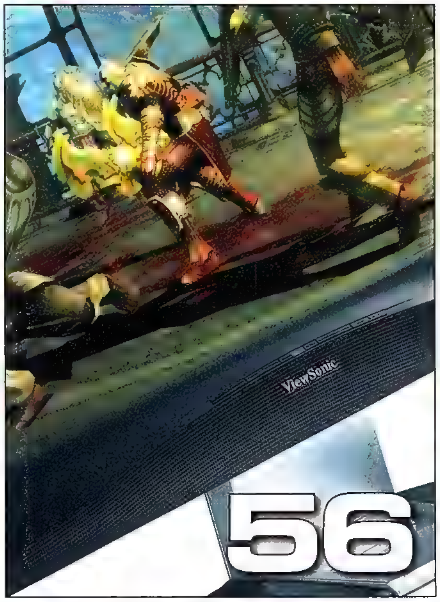
Thermalright Ultra 120 eX 58

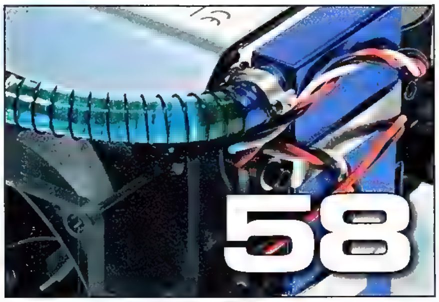
CoolIT FreeZone 58

XFX 8800GTX Ultra XXX 59

Intel Core 2 QX6800 59







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59

BENCHMARK

How we test, what we test, when we test it

3DMark05 and 06 are the legs of our bench. As freely downloadable tools, they allow people all around the world to compete on a single platform, regardless of its indication of real world application, and its ability to keep our table stable.

On the gaming surface, Call of Duty 2 takes first honours in the FPS department. Quake 4 follows closely behind for our OpenGL benchmarks, taking over from where the venerable Doom 3 left off and offering multiple CPU optimisations. Half-Life 2 remains, its market penetration simply too huge to ignore. X3: Reunion makes an appearance, in an effort to have a benchmark that is not an FPS. In the same line, Splinter Cell: Chaos Theory has also been added. Other games do exist. Honest.

All tests are run at 1280 x 1024, 1600 x 1200 and 1920 x 1200 with vsync off, to cater for the most popular LCD resolution, CRT resolution and those who own widescreen monsters respectively.

To hit the CPU, we use LAME MT, a multithreaded version of the popular MP3 encoder, which is used to compress a standard 30-minute WAV file. Similarly, VirtualDubMod is used to compress a standard 1GB raw video file into XviD at 1300Kb/s. Other CPU specific tests in our stable are Maxon's CineBench and SuperPi Mod. Rounding out the suite, SiSoftware's Sandra tests several subsystems across the board, while HDTach and ATTO Disk Benchmark helpfully provide hard drive scores.

All these tests are run on a Windows XP SP2 platform, running the latest official drivers available. Every test is run three times to eliminate any oddities that may crop up along the way, the final result printed in the magazine being an average of those scores.

Of course, all this is pointless without a standard set of hardware, and as such it is laid out below for the world to see. On with the testing!

The *Atomic* Hot Award is given only to the best. In our roundups, we differentiate the best further using the following awards:

VALUE AWARD This means the product is the best buy price-wise.

PERFORMANCE AWARD Price isn't a big factor – it just has to make our benchmarks burn and our eyes water.

EXTREME AWARD Forget everything. If it's *mind-blowingly amazing*, then it'll get an Extreme Award.

BENCHMARKS

Graphics

3DMark05
Game tests only, 4xAA, 8xAF
www.futuremark.com

3DMark06
Game tests only, 4xAA, 8xAF (SM2.0), 8xAF (HDR/SM3.0)
www.futuremark.com

Half-Life 2
Canals custom timedemo, 4xAA, 8xAF, all details highest, HDR off
www.half-life2.com

Splinter Cell: Chaos Theory
Lighthouse Demo, Shader Model 3.0, 8xAF, shadow resolution high, all features on
www.splintercell3.com

X3 Rolling Demo
High settings, auto quality control disabled, glow enabled, 4xAA, 8xAF
www.egosoft.com/games/x3/info_en.php

Call of Duty 2
Hill 40 – Defend custom timedemo, 4xAA, 8xAF, all options highest
www.callofduty2.com

Quake 4
High quality, 4xAA, 8xAF, Multiple CPU support, all options highest
www.quake4game.com

Subsystems

HDTach
www.simplisoftware.com

LAME MT
softlab.technion.ac.il/project/LAME/html/lame.html

VirtualDubMod
virtualdubmod.sf.net

SuperPi Mod
www.xtremesystems.com/pi

Cinebench
www.cinebench.com

SiSoft Sandra
www.sisoftware.co.uk

Everest
www.lavalys.com

Others

DisplayMate
www.displaymate.com

ATI Tool **www.techpowerup.com/atitool**

RivaTuner
www.guru3d.com/rivatuner

FRAPS
www.fraps.com

CPU-Z **www.cpuid.com**

Stress Prime 2004 Orthos
sp2004.fre3.com

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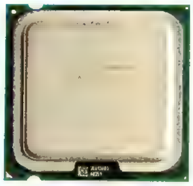
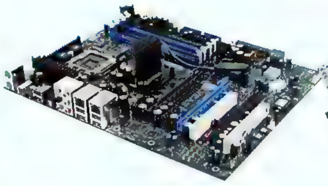
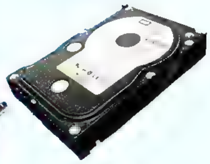


▲ Intel Core 2 Duo X6800



▲ EVGA 680i SLI

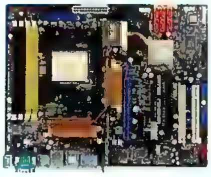
▲ 2GB OCZ Flex XLC PC2-9200



▲ WD 1500ADFD

▲ Seasonic S12 600W

▲ AMD Athlon 64 FX-62



▲ ASUS M2N32-SLI Deluxe

▲ 2GB OCZ Flex XLC PC2-9200

▲ Dell 2405FPW

▲ ASUS 8800GTX

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	Scorpion Technology	1300 726 770	www.scorptec.com.au
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	Aus PC Market	02 9646 8088	www.auspcmarket.com.au
	Capitol Computer	02 9281 8890	www.capitolcomputer.com.au
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	DIY I.T. Supply	08 8340 8090	www.diyit.com.au
	IT4US Computers & Media	08 8231 7588	www.itforus.com.au
QLD	Computer Alliance	07 3421 3200	www.computeralliance.com.au
	Game Dude Computers	07 3387 1500	www.gamedude.com.au
	Dreamworks IT	07 3396 0544	www.dreamworks.com.au
	Umart Online	07 3369 3928	www.umart.com.au
WA	Austin Computers	08 9201 2788	www.austin.net.au/index.asp
	Trinix Computers	08 9350 1600	www.trinix.com.au
	YNOT Computer Systems	08 9330 7666	www.ycs.net.au

LINU

Pre-install Config(2/17)
Networking
Network setup (for install only).
Search for suitable codec?
Slashdot
Welcome to Fedora Core 6!
fedora
fed

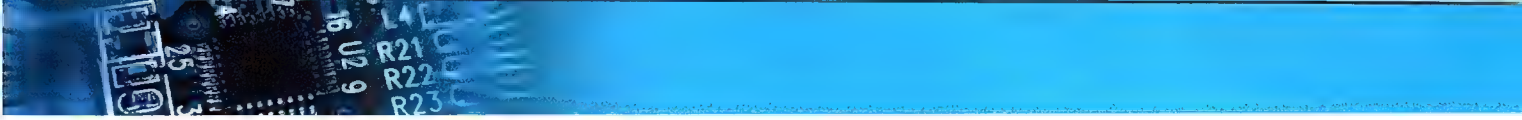
X VS LINUX

Leigh Dyer chased down five popular Linux distributions, dragged them into his house, and asked them a bunch of friendly questions like 'Who's the best?' and 'Which one of you stole my cat?'.

Linux gives you a world of choices, from the applications you run to the desktop environment you use, and you start making those choices before you even install it, by selecting a distribution to install. The distribution you choose defines how you'll install your Linux system, how you'll manage it on an ongoing basis, and how you can expand the base system with new software installations.

Unfortunately, there's no one distribution that's perfect for anyone, but how could there ever be? Different users have different needs, and Linux is all about letting you do what you want, rather than being shoehorned into someone else's idea of a good system. So how do you pick the right distro for you?

Well, that's what *Atomic*'s here to sort out for you. We've looked at distributions at all levels, from the newcomers that need a bit of hand-holding, to those looking to get their feet wet with command-line tools and new technology, and the Linux kung-foo masters that are ready for something truly hardcore. The learning curve can be steep, but if you persevere, you can gain power, flexibility, and the smug satisfaction of knowing that you've mastered the dark arts of Linux.



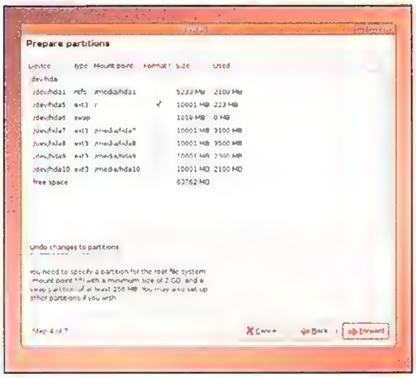
www.ubuntu.com

ubuntu

Linux

Ubuntu has been a community favourite since it appeared less than three years ago, and it's not hard to see why, with it's combination of ease of installation and use, and the hardcore credentials of its Debian base. How does Ubuntu 7.04, aka 'Feisty Fawn', stack up against earlier versions?

INSTALLATION



Prepare partitions

Device	Type	Mount point	Format?	Size	Used
dev/hda					
/dev/hda1	ntfs	/media/hda1		5233 MB	2100 MB
/dev/hda5	ext3	/	✓	10001 MB	223 MB
/dev/hda6	swap			1019 MB	0 MB
/dev/hda7	ext3	/media/hda7		10001 MB	3100 MB
/dev/hda8	ext3	/media/hda8		10001 MB	3500 MB
/dev/hda9	ext3	/media/hda9		10001 MB	2300 MB
/dev/hda10	ext3	/media/hda10		10001 MB	2100 MB
free space				63762 MB	

Undo changes to partitions

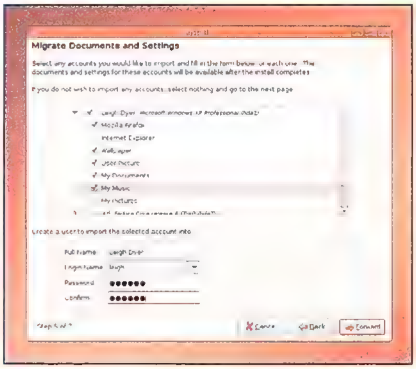
You need to specify a partition for the root file system (mount point "/") with a minimum size of 2 GB, and a swap partition of at least 256 MB. You may also set up other partitions if you wish.

Step 4 of 7

Ubuntu's live CD-based installer is very cool.

Ubuntu installs from an impressive single CD, called the 'desktop' CD. Rather than booting directly into the installer, the desktop CD boots a full live CD version of Ubuntu, which you can use and test. If you decide to install it, a double click on the 'Install' icon on the desktop will launch the GUI-based installer. It's generally quite easy to use, and has some nice touches, such as partition resizing support.

Feisty's installer adds another neat touch: A user migration wizard. This scans your hard drive for existing installations of Linux or Windows, and offers to copy across certain user settings, like background images, bookmarks, and even documents.



Migrate Documents and Settings

Select any accounts you would like to import and fill in the form below for each one. The documents and settings for these accounts will be available after the install completes.

If you do not wish to import any accounts, select nothing and go to the next page.

Create a user to import the selected account into

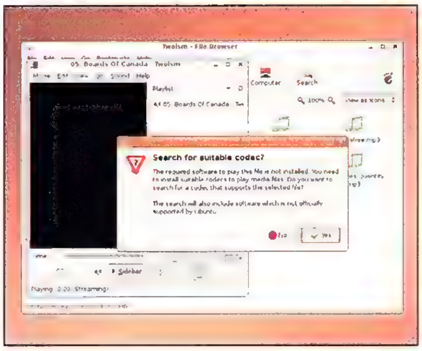
Full Name: Leigh Dyer
Login Name: leigh
Password: ●●●●●●
Confirm: ●●●●●●

The installer can migrate user settings from other operating systems.

If you have multiple users, they can be migrated to separate user accounts on your Ubuntu system.

The desktop installer CD has two issues that will make it unusable for some people: It only supports standard partitions, rather than LVM or RAID, and it has no package customisation options. If you need these features, you can drop in the 'alternate' CD, which uses a modified version of the Debian installer.

DESKTOP



Search for suitable codec?

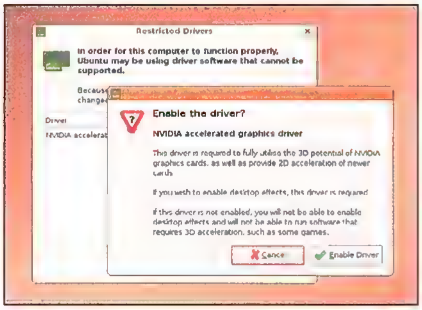
The required software to play this file is not installed. You need to install suitable codecs to play media files. Do you want to search for a codec that supports the selected file?

The search will also include software which is not officially supported by Ubuntu.

Ubuntu's default media player can download codecs for you as required.

You certainly wouldn't mistake Ubuntu for anything else – its 'human' theme of brown and well, more brown is a bit of a trademark. All the good stuff is there though, with a super-fresh GNOME 2.18 desktop, Firefox 2 as the default browser, Evolution for email and OpenOffice.org 2.0 for the mundane work. Ubuntu includes just one application of each type in the base install, but you can easily add others.

Out of the box, Ubuntu doesn't include NVIDIA or ATI drivers, but you can install them easily with the 'Restricted Drivers Manager' tool. Similarly, Ubuntu doesn't support MP3, but if you double click on an MP3 file, you're automatically prompted to install the appropriate codec pack, which again takes just a few clicks. Once you have 3D drivers installed, you can easily enable desktop effects through the 'Desktop Effects' panel.



Restricted Drivers

In order for this computer to function properly, Ubuntu may be using driver software that cannot be supported.

Enable the driver?

NVIDIA accelerated graphics driver

This driver is required to fully utilise the 3D potential of NVIDIA graphics cards, as well as provide 2D acceleration of newer cards.

If you wish to enable desktop effects, this driver is required.

If this driver is not enabled, you will not be able to enable desktop effects and will not be able to run software that requires 3D acceleration, such as some games.

The Restricted Drivers Manager gets 3D drivers installed quickly.

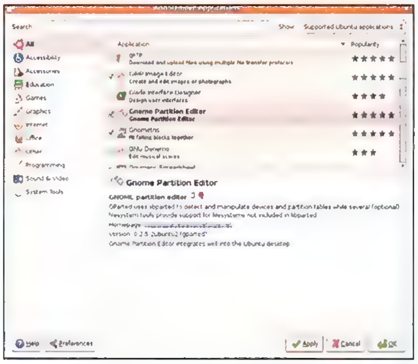
PACKAGE MANAGEMENT

Because Ubuntu is Debian-based, it uses the 'deb' package format, and the APT system to easily install and upgrade packages. There's a choice of interfaces available: Updates are handled with the neat and unobtrusive 'Update Manager', while new software can be added using the 'Add/Remove' tool. You can upgrade your system or install new packages with a single 'apt-get' command at the command line too. It's handy that installing software is so easy, because there's a tonne on offer – more than 5,000 official packages, with another 16,000 in the unofficial, community-maintained 'universe' and 'multiverse' repositories.

Ubuntu also makes upgrading to a new version remarkably simple. If you use the Update Manager, a message will appear inside it when a new release of Ubuntu is out, letting you upgrade over the 'Net with just a few clicks.

HARDWARE SUPPORT

Ubuntu has always been on the cutting-edge of hardware support, and Feisty continues the trend. Feisty has perhaps moved a bit too fast though – on our Intel P965 test system, a Sound Blaster Live! card was temperamental at best, and the JMicron IDE controller had issues with the beta release, though this was fixed for the final. The 'desktop' CD is great here though, as you can easily test your hardware compatibility before installing.



Gnome Partition Editor

GNOME partition editor

GParted uses libparted to detect and manipulate devices and partition tables while several (optional) filesystem tools provide support for filesystems not included in libparted.

Gnome Partition Editor integrates well into the Ubuntu desktop

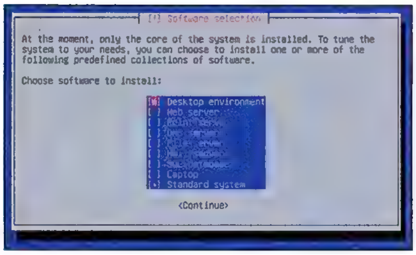
The Add/Remove tool gives you easy access to that enormous package list.

www.debian.org

debian

Debian has been around since the early days of Linux, and it plays an important role due to its strict free software policies (the Debian Free Software Guidelines are a key description of open source), and support for a wide range of computer architectures. Can this new release make Debian relevant to new users in the face of the Ubuntu onslaught?

INSTALLATION



```
[!] Software selection

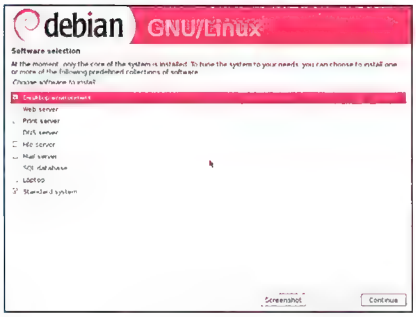
At the moment, only the core of the system is installed. To tune the
system to your needs, you can choose to install one or more of the
following predefined collections of software.

Choose software to install:

            [*] Desktop environment
            [ ] Web server
            [ ] [illegible]
            [ ] [illegible]
            [ ] [illegible]
            [ ] [illegible]
            [ ] [illegible]
            [ ] Laptop
            [*] Standard system

                  <Continue>
```

The Debian installer in text mode...



Software selection

At the moment, only the core of the system is installed. To tune the system to your needs, you can choose to install one or more of the following predefined collections of software.

Choose software to install:

- ☑ Desktop environment
- ☐ Web server
- ☐ Print server
- ☐ DNS server
- ☐ File server
- ☐ Mail server
- ☐ SQL database
- ☐ Laptop
- ☑ Standard system

...and in GUI mode.

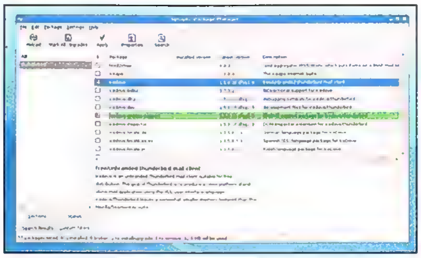
Debian's text-based installer may not be very shiny, but it's quick, flexible, and actually quite intuitive in most respects. Partitioning is where it falls apart to a degree: The guided partitioning options are great, but if you need to use custom partitioning, the interface isn't very intuitive. It works well once you understand it and it's quite powerful – Debian supports software RAID, LVM, and encrypted file systems out of the box.

Etch actually adds a GUI installer, but it's absolutely identical to the text version, even down to the partitioner. It's really there for users of more exotic languages that can't be drawn properly in text display modes, rather than as a user-friendly replacement.

After partitioning, you get to optionally enable a network mirror for downloading more software (with a good selection of mirrors on offer), and you can then enable various basic package profiles to install, such as 'Desktop environment' and 'Web server'.

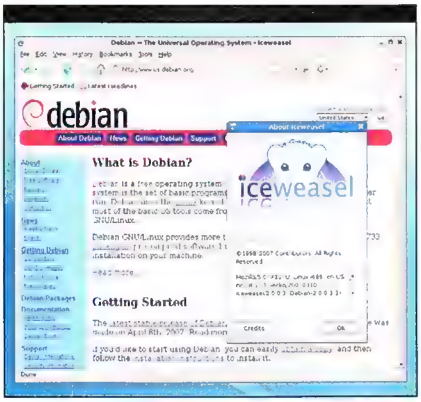
Etch ships on 23 CDs, but you can install with just the first CD, which includes a full desktop and application suite. If 700MB is too big, you can try the 40MB installer CD, which downloads packages straight from your local Debian mirror.

DESKTOP



Debian's GNOME desktop is slightly old, but still slick.

After performing a standard install with the 'Desktop environment' option ticked, we sat through a completely text-based boot sequence before the GUI started, presenting us with an attractive login screen for the GNOME desktop. Debian focuses on stable, well-tested software, so while its GNOME 2.14 desktop is a couple of versions behind, it proved very solid in use. Customisation is minimal: The icons, themes, layout, and behaviour are all standard, with just a Debian wallpaper to tell you what Linux you're running.



Debian's GNOME desktop is slightly old, but still slick.

Firefox 2.0 is the default browser, but it's not called Firefox – Mozilla's use of trademarks conflicts with the Debian Free Software Guidelines, and so the decision was made to re-brand Firefox under the name Iceweasel. Thunderbird has had a similar name change to Icedove. Everything works exactly as you'd expect though, so it makes little difference in practical terms.

Administrative tools are slightly thin on the ground though – for instance, there's no X setup tool. The installer automatically misconfigured the resolution of our monitor, and the only way to fix it was to manually edit the config file.

PACKAGE MANAGEMENT

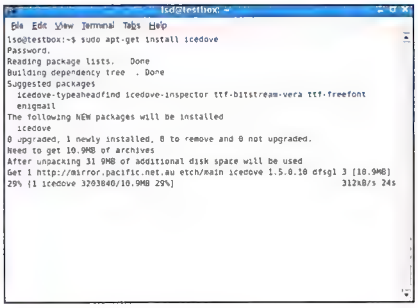
Debian uses the same update manager as Ubuntu, and it works well, quickly processing downloaded updates. For adding software, there's Synaptic, a GUI interface to Debian's APT system, which also works well, though the command-line 'apt-get' and 'aptitude' tools are better once you learn them.

APT was always designed with major version upgrades in mind, so upgrading to new versions of Debian is generally trouble-free.

Though Debian's stable releases don't come often, it's worth mentioning the 'testing' branch of Debian, which is automatically built from packages that have passed some initial testing in the 'unstable' development branch. This gives you relatively up-to-date packages all the time, with few major problems along the way. With APT, it's very easy to switch to 'testing', and then keep up with the changes.

HARDWARE SUPPORT

Out of the box support was good on both test systems, with everything working as expected. Proprietary drivers from NVIDIA and ATI are available as well, though they're in Debian's 'non-free' repository. You can enable this repository and install the driver packages through Synaptic, though enabling the drivers may require more manual configuration editing.



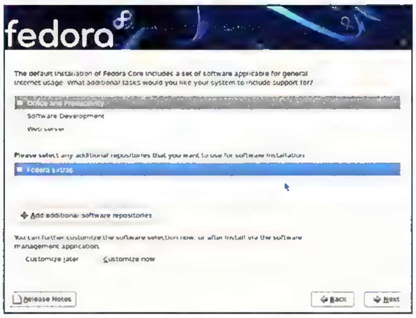
```
lso@testbox:~$ sudo apt-get install icedove
Password.
Reading package lists.   Done
Building dependency tree  . Done
Suggested packages
  icedove-typeaheadfind icedove-inspector ttf-bitstream-vera ttf-freefont
  enigmail
The following NEW packages will be installed
  icedove
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 10.9MB of archives
After unpacking 31 9MB of additional disk space will be used
Get 1 http://mirror.pacific.net.au etch/main icedove 1.5.0.10 dfsg1 3 [10.9MB]
29% [1 icedove 3203840/10.9MB 29%]                              312kB/s 24s
```

Debian doing what it does best - installing software through APT.

fedora

Fedora itself may be just a few years old, but its origins date much further back. It's a direct descendent of Red Hat Linux 9, the last of the non-enterprise releases, and Red Hat continues to support Fedora as a free, community distribution. It's also used as a testbed for new technologies, being among the first distributions to include features like Xen and SELinux.

INSTALLATION


The default installation of Fedora Core includes a set of software applicable for general internet usage. What additional tasks would you like your system to include support for?

- ☑ Office and Productivity
- Software Development
- Web server

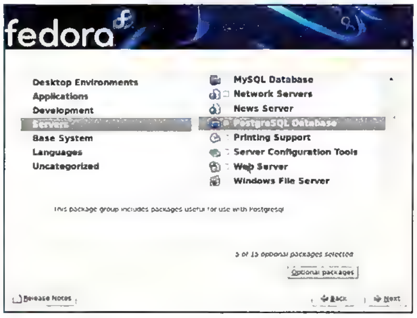
Please select any additional repositories that you want to use for software installation.

- ☑ Fedora Extras

You can further customize the software selection now, or after install via the software management application.

○ Customize later ○ Customize now

The Fedora installer offers a few different software profiles.



This package group includes packages useful for use with PostgreSQL

5 of 15 optional packages selected

More fine-grained package control is available as well.

Fedora uses a GUI-based installer called Anaconda. Like the Debian installer, it's quite flexible, with support for various network install methods, software RAID and LVM storage, and an optional text-based interface, though it lacks partition resizing support.

One neat trick is the optional ability to control the installer remotely through VNC, which is particularly handy in an office or server environment.

The list of packages to install can be tailored through broad categories like 'Web server' that lead to more fine-grained options. You can also choose to enable support for Fedora Extras, a community-supported package set.

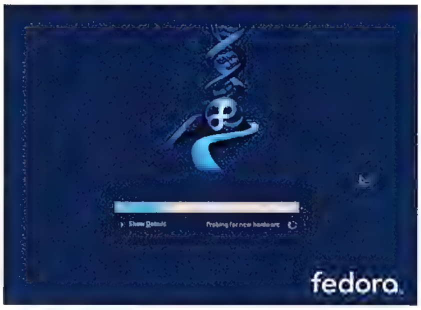
The installation process is fairly quick, especially considering the amount of software in the default single-DVD installation. Surprisingly, unlike every other distribution, Fedora was able correctly detect the 1440 x 900 resolution of our monitor.

DESKTOP

GNOME 2.16 is the default desktop in Fedora, though it's customised with a unique theme and icon set that's applied to both GNOME and KDE. This makes applications from the two desktops a much closer visual match.

Fedora labels several key applications with simple names, such as 'Web Browser' and 'Email' (those tools are Firefox and Evolution, respectively). OpenOffice.org is also installed by default, with names like 'Word Processor' and 'Presentations' for its components. Much like the custom artwork, this should improve ease-of-use for newcomers, though it may confuse experienced Linux users.

Fedora is the only distribution to enable SELinux by default. This system provides extensive control over access to privileged resources. For instance, normally a web server like Apache would need to run as the root user, at least initially, because it uses TCP/IP port 80, which is a privileged port. Under SELinux, Apache can be given specific permission to open port 80, without needing root access. More generally, SELinux improves security by limiting entry points for hackers, and minimising the potential for further damage if a system is compromised.



Fedora's boot display is definitely the coolest of the bunch.

fedora
Welcome to Fedora Core 6!

The icons and theme are customised, but it's standard GNOME otherwise.

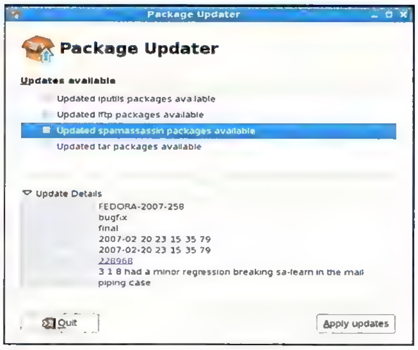
PACKAGE MANAGEMENT

Fedora uses Red Hat's RPM system for package management and on top of this adds an automated network package installer called 'yum'. This makes it relatively easy to install new packages from network repositories with the manual dependency installation that RPM systems once suffered from. Unfortunately, yum tends to be slow in operation, partly because it checks your repositories for new packages every time it's run rather than having a dedicated update command and uses more CPU time than it perhaps should.

On the desktop there's automated update notification, which feeds in to a neat, though somewhat sluggish, GUI-based update installer. There's a GUI-based software installer as well, but it lists only a limited selection of packages, so you'll need to resort to the command line for most software installation.

HARDWARE SUPPORT

Everything worked as expected with Fedora on our test systems, so it was off to a great start. Proprietary drivers aren't available by default, but a third-party repository at **rpm.livna.org** has up-to-date packages. Unfortunately, these packages work only with kernels compiled for i686 systems, but there's a bug in Anaconda that causes most systems to be installed with i586 or lower kernels. The steps required to install the proper kernel are documented on the Fedora site, but the problem wasn't immediately obvious, so it's something to watch out for.



- Updated iputils packages available
- Updated lftp packages available
- ☑ Updated spamassassin packages available
- Updated tar packages available

Update Details

FEDORA-2007-258
bugfix
final
2007-02 20 23 15 35 79
2007-02-20 23 15 35 79
228968
3 1 8 had a minor regression breaking sa-learn in the mail piping case

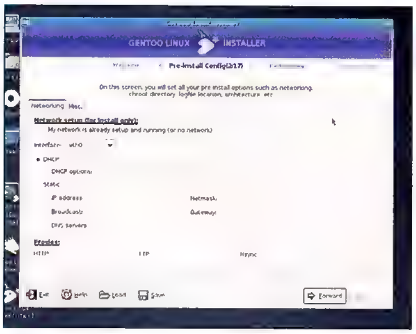
The updater is a little slow, but it does the job.

www.gentoo.org

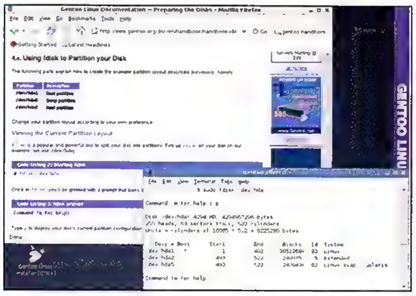
gentoo linux™

Gentoo's always been the very definition of 'hardcore' in the Linux world, with its source-based package installer and extensive customisation, so we just couldn't do an *Atomic* Linux distro round-up without it.

INSTALLATION



The automated installer should be great when it's complete.



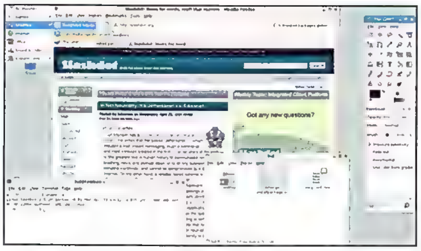
For now, a terminal and web browser are still the best approach.

Gentoo installation has traditionally been a manual process, with a minimal live CD, some base system tarballs, and a bunch of online documentation that takes you through manually partitioning and formatting your drive, extracting the base system, setting up the Portage package manager, building and installing a kernel and installing a boot-loader before finally booting into your new system.

This release does feature an automated installer, but it's incomplete, and the Gentoo Handbook still recommends the manual process. It sounds involved, but it's actually fairly straightforward, and if you treat it as a learning exercise it can be good fun. The documentation guides you through the process with clear instructions and copy-and-paste example commands, so Linux experience isn't strictly required, though it does help.

There are two options for kernel setup: Configure and build a kernel customised to your hardware or use the 'genkernel' command to build a generic kernel with drivers for just about everything. Customising is definitely the Gentoo way, but the generic kernel is a good alternative.

DESKTOP



Gentoo doesn't have a preferred desktop, but you can easily install your favourite.

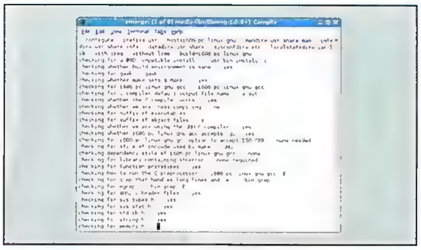
Gentoo doesn't have a preferred desktop, and after a standard installation you won't have one at all – all you get after booting is a text prompt. You can install any kind of desktop you like, from a simple window manager like Fluxbox (a popular option among Gentoo users) or WindowMaker through to complete desktops like GNOME, KDE and XFCE, along with the X.Org X server itself.

Portage, the famed Gentoo package manager, makes this relatively easy, though there are a few potential snags when building X, and you'll need to manually configure it before it will run. If it's your first time, you'll really need a browser handy to read the X installation guide. Thankfully, if you don't have a second PC handy, text-mode browsers like 'links' work well with the Gentoo website.

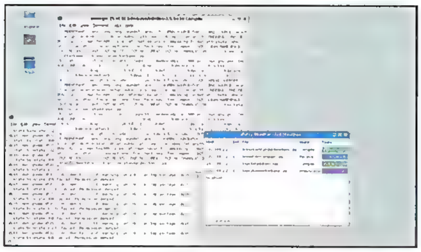
PACKAGE MANAGEMENT

Portage is Gentoo's main selling point: It's a package manager that's based on the BSD 'ports' concept. It can install applications and their dependencies with a single command, but instead of downloading packages, it downloads the source code, which is then built automatically.

An advantage of Portage is its 'USE variable' system, which lets you enable or disable optional package features system-wide. For instance, if you like the ALSA sound system, you can add 'alsa' to your USE variables, and ALSA support will be automatically enabled in any packages that offer it. Similarly, if you despise GNOME, adding '-gnome' will disable GNOME support in packages as they're installed.



Portage: The ultimate excuse for a dual-core PC.



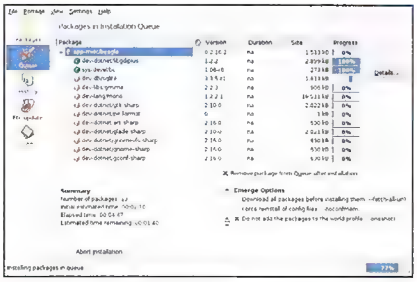
distcc spreads compile jobs across your LAN.

Of course, compiling everything from source takes time – even a fast system will take hours to install GNOME or KDE. However, Portage can make some use of multiple CPU cores, and it can even send build jobs to other systems with 'distcc', a distributed build system.

Portage has good support for upgrades, both for individual packages and for the whole system, with the ability to upgrade every package with a single command. As far as GUI frontends go, there's a nice one called Kuroo, but Portage is really designed for the command line.

HARDWARE SUPPORT

The generic kernel worked well on our test systems, though the beauty of building your own kernel is that you can patch and tweak it to improve its hardware support. If you know what you're doing, anything that can work in Linux should work with Gentoo.



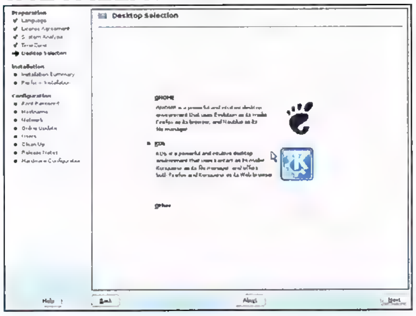
If you really need a Portage GUI, Kuroo is a good option.

www.opensuse.org

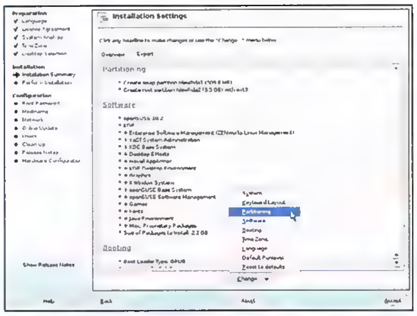
openSUSE™

openSUSE stands out among Linux distributions: It's creator, Novell, has a lot of developers on staff, and it shows in the level of customisation applied. It also stands out because it's relatively young, even though its commercially-licensed SUSE counterpart has been around for over a decade.

INSTALLATION


Desktop Selection
GNOME
KDE
Other
Help
Back
Abort
Next

openSUSE offers top-level support for both GNOME and KDE.


Installation Settings
Overview
Expert
Partitioning
Software
Booting
Change...
Help
Back
Abort
Accept

The editable summary approach to installing is awesome.

The openSUSE installer really is impressive, with lots of neat features. Rather than stepping you through each part of the installation process, it works by selecting default values for everything, and then listing these values in a single summary screen. There's bound to be something you'll need to change, but you can easily edit just those settings, which generally makes it much quicker to configure. It also means that you can leave the installer to do its work once you've ticked off on the settings, rather than waiting as it completes each section.

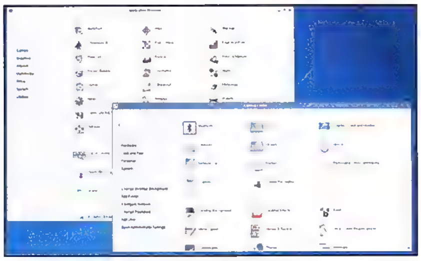
After the first-stage installation, there is a bit of wizard work involved in setting up a user account and network updates. The editable defaults system returns for the final hardware configuration though. This proved handy for us: The monitor resolution was mis-detected, but just clicking on that setting brought up the X settings dialog, where the proper resolution was easily entered.

One annoyance lies in the partitioner: It seems impossible to create an extended partition to install on, rather than a primary. It happily installed onto an extended partition that we'd already created, though.

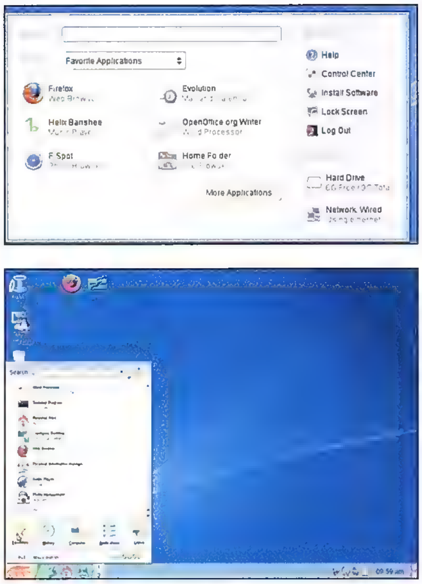
DESKTOP

openSUSE gives you the choice of GNOME and KDE in its installer, though GNOME is the default option. Both desktops are heavily customised: For instance, GNOME features an entirely new main menu, which shows just a few applications and a search bar alongside a panel of 'System' items like the Control Center. There's also a 'More Applications' button which reveals an application browser.

The search feature is powered by Beagle, the Novell-developed desktop search engine that's based on Mono, the open source .NET framework also spearheaded by Novell. Beagle can launch applications, or find files, folders, and bookmarks among other things. Other Mono-based applications feature prominently too, including a 'sticky note' tool called Tomboy, and a photo manager called F-Spot.



The GNOME desktop uses windows rather than menus for its application lists.


Favorite Applications
Firefox
Web Browser
Evolution
Helix Banshee
OpenOffice.org Writer
Word Processor
F-Spot
Home Folder
More Applications
Help
Control Center
Install Software
Lock Screen
Log Out
Hard Drive
Network: Wired
Search

The GNOME and KDE main menus are both completely customised.

Desktop Search: openoffice
Search
View
Help
Find:
openoffice
Find Now
Applications
OpenOffice.org Writer/Web
OpenOffice.org Writer
OpenOffice.org Calc

Beagle lets you search for files, folders, and apps.

Another neat desktop feature is the excellent range of GUI configuration tools. You can handle just about everything through the GUI, including display configuration, hardware driver setup, boot loader tweaking, update configuration, and software installation.

Desktop effects also feature in openSUSE – after all, Novell created Xgl in the first place. You can enable them and configure their settings through the Control Panel, though the automated driver installer included there from SUSE doesn't work in openSUSE.

PACKAGE MANAGEMENT

Like Fedora, openSUSE uses Red Hat's RPM package format, and it also includes the 'yum' command-line tool for each package installation. On top of this, openSUSE includes the ZENworks Management Daemon (zmd), Novell's custom package management system. zmd is used primarily to update and install software from the official SUSE repositories.

Updates are installed through a notification icon on the desktop. New software can be installed through the 'Software Management' tool, or by using 'yum' or 'rug' (a zmd interface) from the command-line.

You can upgrade between versions of openSUSE using the installer, which can detect and upgrade existing installations. There's some support for online upgrades through the Software Management tool, but this isn't officially supported at all, and could easily damage your system.

HARDWARE SUPPORT

Everything on our test systems worked well with openSUSE with little or no configuration. Proprietary driver support would be great if the provided installer tool worked, but we think there are licensing issues preventing that for now. However, NVIDIA packages its drivers specifically for openSUSE and it's easy to install them using the NVIDIA yum repository.

CONCLUSION

We think it's safe to say that Gentoo is the most hardcore distro on test here: it's really designed with customisation in mind, giving users near-total freedom to build their system exactly as they want. Sure, compiling everything means that installing new apps or performing security updates can take a while to complete, but that can be half the fun. It's a great way to use multiple CPUs or CPU cores, and with distcc you can use CPU resources across your LAN as well.

Part of Gentoo's hardcore image comes from the fact that it really is quite difficult to use at first, especially compared to systems with slick installers and pre-configured desktop environments. You have to put in the effort to learn how Gentoo is structured and how Portage works, but once you've climbed that learning curve, you're rewarded with a system that's actually relatively easy to work with.

You can get much the same hardcore feeling with Debian though, and without as much waiting or hassle. Debian lets you install a minimal system very similar to Gentoo's 'stage3' system just by de-selecting a few options in the installer. After boot-up you're dropped a text prompt, and can then use 'aptitude' to install X.Org and the desktop of your choice from a mountain of options, without the need to build anything from source. Ubuntu can do the same thing, by using the 'alternate' install CD in expert mode.

Debian's precompiled packages would seem to lack the benefits of Gentoo's USE variable system to configure package options. However, in many key cases, individual applications are split in to several Debian packages containing different components or options, which gives you much of that flexibility. It's arguably better than Gentoo in some cases: If you have a client and server distributed as one source package, Debian would typically package them in to separate binaries, whereas Gentoo would require you to install both client and server, even if you didn't need both.

Perhaps the idea of 'hardcore' comes down to what you can get done with your system. Ubuntu is easy to install, update and upgrade, and makes it simple to enable hardware-accelerated 3D and desktop effects, as well as to install new software. Underneath all that though, you have an enormous pool of applications to install, most of which are very up-to-date. Being easy to use doesn't make it less hardcore – it just makes it easier for users to experiment and see what Linux has to offer beyond the usual desktops and apps. Fedora's a bit hardcore in that sense too, thanks to its out of the box support for advanced features like Xen and SELinux.

That just leaves openSUSE, which really doesn't have any claim to being hardcore – it has to be content with being arguably the easiest distribution here for a new user to install, configure, and maintain. If you've never used Linux before, or you've had problems with other distributions, it's a great place to start.

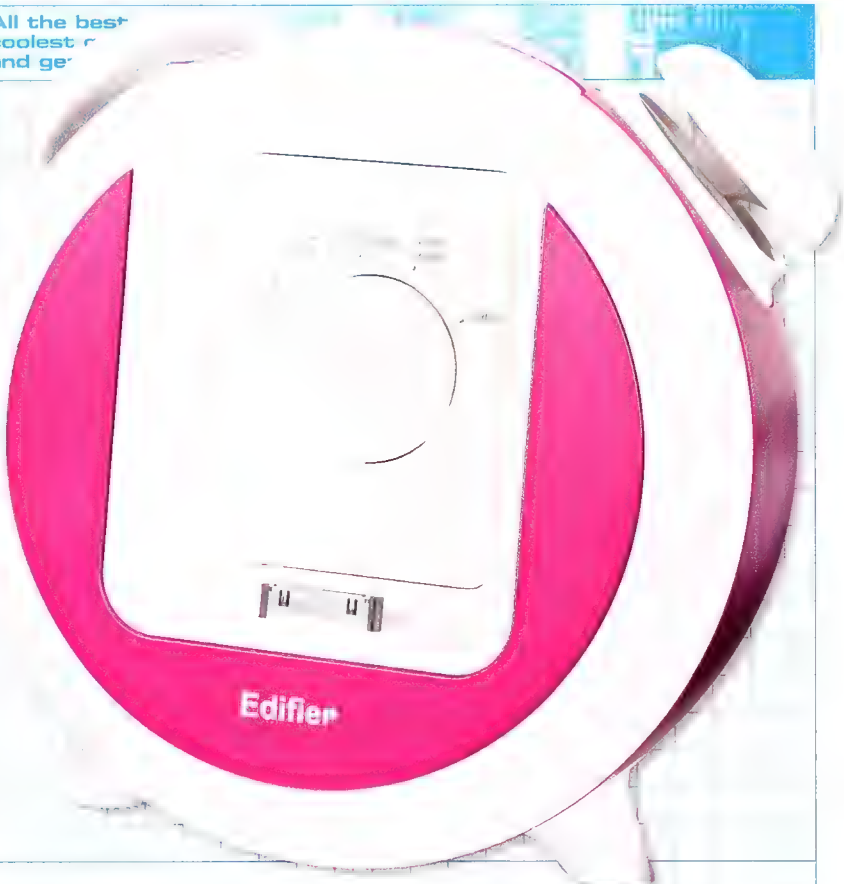
BEING EASY TO USE DOESN'T MAKE IT LESS HARDCORE - IT JUST MAKES IT EASIER FOR USERS TO EXPERIMENT AND SEE WHAT LINUX HAS TO OFFER BEYOND THE USUAL DESKTOP...

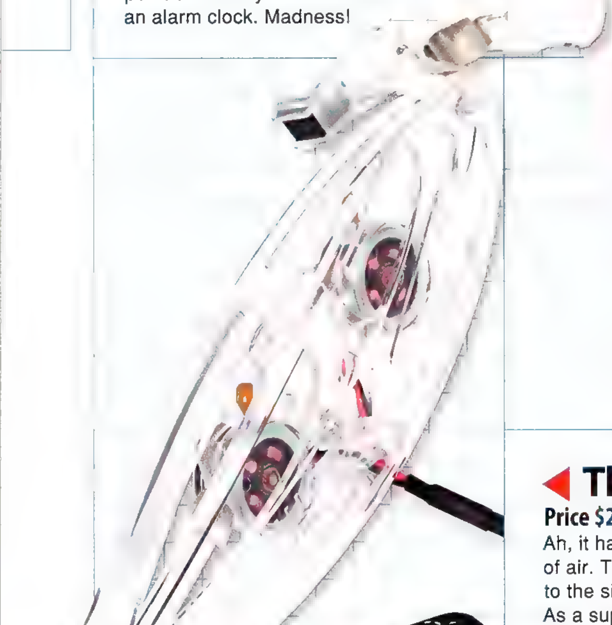
openSUSE™
ubuntu
Linux
gentoo linux™
fedora
debian

Edifier iF200 ▶

Price $99 **Supplier** Audion Innovision
Website www.audion-mm.com

To edify means to promote spiritual or intellectual growth. We somehow doubt however that the Edifier iF200 could perform such an act, unless your iPod happened to contain a reading of *Great Expectations* by Leonard Nimoy. What the iF200 does do is function as an alarm clock, playing tunes from your MP3 player to wake you from your slumber. A great purchase if morning radio or that monotone buzz is driving you to the point of insanity. It even looks like an alarm clock. Madness!





◀ Thermaltake Cyclo

Price $25 **Supplier** Thermaltake **Website** www.thermaltake.com.au

Ah, it has eyes! No, no they're just fans – tiny buggers that rotate at 4500rpm and move 9.3cfm of air. The purpose of this crab-like, plastic beetle is to keep your RAM modules cool. It clips on to the sides of the slot and hovers above the chips, and requires a free four-pin molex to power it. As a super special bonus, blue LEDs light up when it's in operation. If you think your RAM sticks could do with a bit more bling, then the Cyclo is for you.

◀ Bluegears b-flexi120

Price $29.90 **Supplier** iCompany Group
Website www.icompanygroup.com

At first glance, this product closely resembles a 120mm fan, and that would be because it is one. According to Bluegears – a company that can't decide if its own name starts with a capital letter or not – it spins at 1500rpm and pushes 48.75cfm of air. Oh, and it can glow red, blue or green on demand for the LED-obsessed.

euromint™
the caffeinated peppermint
net wt. 1.76 oz. (50g)

Euromint Caffeinated Mints ▶

Price $5 **Supplier** PC Case Gear **Website** www.pccasegear.com.au

The perfect example of the old 'Hide-the-herpes-simplex-virus-in-edible-mint-form' chestnut. Almost got us there, Euromint. We're only kidding of course, everyone knows the only way you can get herpes is from toilet seats. The only thing you'll catch from these mints is a case of the wake-me-ups, which can be a particularly good thing if you need to stay awake. Three tablets will give you the same amount of kick as a can of Coke, so moderate your dosage appropriately.

Microsoft Reclusa Gaming Keyboard

Price $119.95 **Supplier** Microsoft
Website www.microsoft.com

Having designed the near ultimate gaming mouse with the Habu, Microsoft has tried its hand at designing a keyboard in the same vein. Considering the key layout hasn't thrown a few decades of knowledge out the window in pursuit of something exotic, like so many other gaming keyboards, all we can say is that it's pretty darn good. Included are 12 programmable keys and a pair of jog dials.

Corsair Flash Voyager 16GB

Price $250 **Supplier** Altech
Website www.altech.com.au

Portable flash drives don't get much more rubber-coated than this. Or bigger. Weighing in at an astounding 16GB, this baby could hold the entire contents of any of the special ultimate extended director's cut editions of the *Lord of the Rings* films... with a bit of shoehorning. The Voyager also comes TrueCrypt so you can create encrypted virtual drives, if that's your thing.

CORSAIR
Flash Voyager

Cooler Master

CoolerMaster X-Craft 360

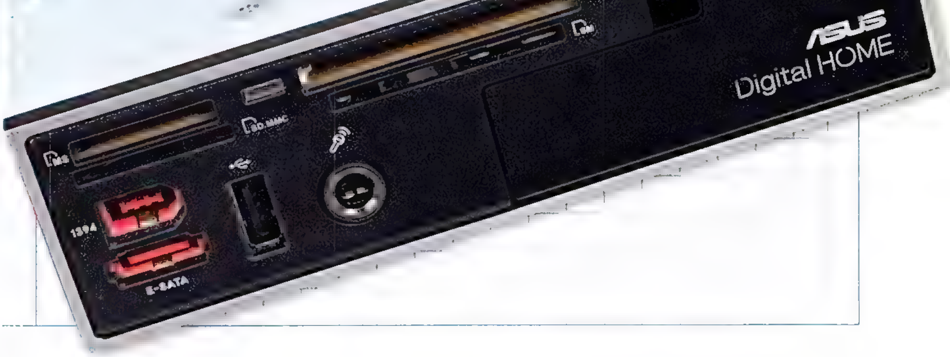
Price $TBA **Supplier** Cooler Master
Website www.coolermaster.com.tw

External hard drive cases never looked sexier than the piano black X-Craft 360. Apart from the minor innovation of taking 3.5" SATA 3Gb/s drives, slotting in a hard drive was never easier, thanks to a tool-less system. You can plug it up through USB 2.0 as well, for some bitchin' 480Mb/s transfer rates. Well, not as bitchin' as eSATA, so isn't it fortunate it has that as well? Yep, a full 3Gb/s available at your fingertips. If you have a few spare desktop drives hanging around with no machine to shove 'em in, you could do worse than pick yourself up one of these little numbers.

ASUS Digital Home Frontlinker

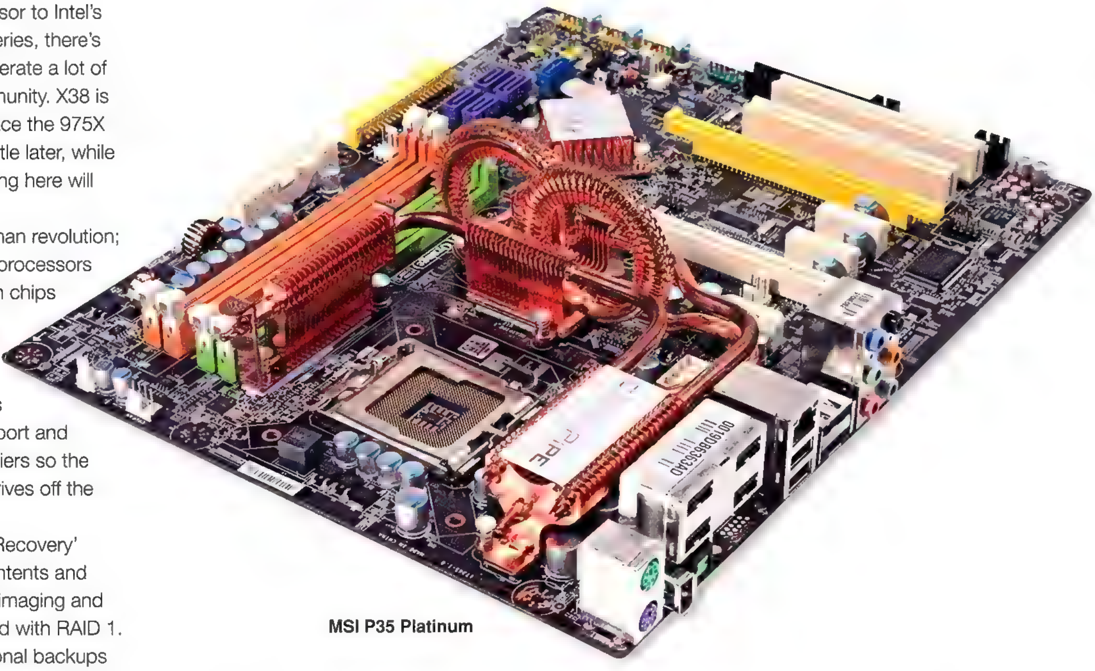
Price $85 **Supplier** ASUS
Website www.asus.com.tw

What manner of contraption is this? It's a rather feature-packed baybus, actually. Along with slots for MemoryStick, CF, SD MMC and SM, eSATA, FireWire and USB 2.0 plugs make an appearance too. For the ultra-hip, a fold-out compartment hides inputs for iPods and a 3.5mm jack.



MSI P35 Platinum, ASUS P5K/P5K3 Deluxe, GIGABYTE P35-DQ6

Salmon in mouth, Craig Simms frolics with Intel's Bearlake.



MSI P35 Platinum

Bearlake is here. As the successor to Intel's wildly popular 965 and 975-series, there's no doubt these new boards will generate a lot of interest among the enthusiast community. X38 is the name of the mobo that will replace the 975X (adding PCIe 2.0) and will come a little later, while the P35 series boards we're reviewing here will take over for the P965.

It's definitely an evolution rather than revolution; the ability to handle 1333MHz FSB processors such as the upcoming 45nm Penryn chips being P35's most notable feature. The only other major change is the new ICH9 southbridge, which comes with the same capabilities as ICH8, but drops PS/2 and LPT support and allows eSATA ports to act as multipliers so the user can daisy chain a number of drives off the one port.

A new technology called 'Rapid Recovery' is also implemented – which for all intents and purposes seems to be a hard drive imaging and incremental update program crossed with RAID 1. It's capable of scheduled or conditional backups to a selected drive (for example, auto-updating the clone drive whenever a notebook is docked), or like RAID 1 can simply be permanently updated. The clone can then be mounted as a read-only volume to recover files individually or completely replace a failed drive.

Cross what?

The board also supports two PCIe x16 length slots, although like the P965 only one is 16x, with the other at x4. We can hear you all ask now: Does it still run CrossFire? The answer is a little drawn out. By all accounts they should – however the MSI board wouldn't boot with our X1950XTXs. The ASUS P5K and Gigabyte P35-DQ6 would boot and the CrossFire option appeared, yet when trying to enable the feature it would error out, claiming a 3D application was running, the interconnect cable wasn't connected or the motherboard had no communication channels between the PCI Express slots. Apparently a driver update from ATI will fix this.

MSI P35 Platinum

The MSI board uses a Fintek F71882F6 controller to handle PS/2 and FDD controllers as well as hardware monitoring, while engaging a Marvell 88SE6111 for the IDE controller and one extra internal SATA connector, and VIA's VT6308 for 1394 support. A Realtek RTL8168 handles the gigabit network duties while a Realtek ALC888T chip brings us sound, with the back plate supporting optical S/PDIF underneath the oddly elevated set of four USB ports, bringing the total to six. Two of the SATA ports supported by ICH9

SPECIFICATIONS

Price MSI: $299, $379/429, $355 **Street Price** $TBD
Supplier MSI, ASUS, GIGABYTE
Website www.msi.com.tw, www.asus.com.tw, www.gigabyte.com.tw

Board	MSI P35 Platinum	ASUS P5K	ASUS P5K3	Gigabyte P35-DQ6
Socket	775	775	775	775
Southbridge	ICH9R	ICH9R	ICH9R	ICH9R
Memory	DDR2	DDR2	DDR3	DDR2
PCIe 16x/8x/4x/1x	1/0/1/2	1/0/1/2	1/0/1/2	1/0/1/3
PCI	2	3	3	2
Internal SATA	4	6	6	8
eSATA	2	2	2	Up to 4 via internal passthroughs
PATA/FDD	1/1	1/1	1/1	1/1
Extras	Optical S/PDIF; 6-pin FireWire	Optical/Coax S/PDIF; 6-pin FireWire; onboard 802.11g	Optical/Coax S/PDIF; 6-pin FireWire; onboard 802.11g	Optical/Coax S/PDIF, 6-pin FireWire; parallel & serial ports

> They can handle 1333MHz FSB processors, such as the upcoming 45nm Penryn.

have become eSATA, leaving five (including the Marvell-controlled one) for internal use. As tends to be the case with most high-end boards these days, solid capacitors are used exclusively.

Of note is MSI's rollercoaster inspired 'Circu-Pipe' heatpipe. Presumably this allows greater surface area for heat dissipation than just a straight pipe, while at the same time looking cool. It causes no clearance issues either – the same can't be said of the southbridge heatsink though, which was high enough to leverage the rear of our 8800 GTX out of the PCIe slot. It still worked, but we wouldn't be comfortable with mounting the board in a case unless we used a single-slot card.

Other layout problems arise with the 8-pin auxiliary power connector, which is hidden among the heat pipes, bringing potential cable routing issues. One SATA connector will be lost if you have a dual-slot, dual-card solution, which also makes access to the CMOS reset button difficult.

Otherwise everything is quite solid indeed, a standout feature being MSI's super bright LED system on the board to diagnose hardware issues. It still requires you to delve into the manual to decode them much like beep errors, but thankfully identifies problems in much greater detail.

Overclocking was an interesting experience, the board not recovering gracefully from pushing it too far, requiring a straight CMOS clear every time. With the standard BIOS it didn't peak 350MHz, but with a performance BIOS supplied by MSI (the features of which we're told will filter into the normal BIOS as time progresses) allowed us to hit 460MHz Orthos stable.

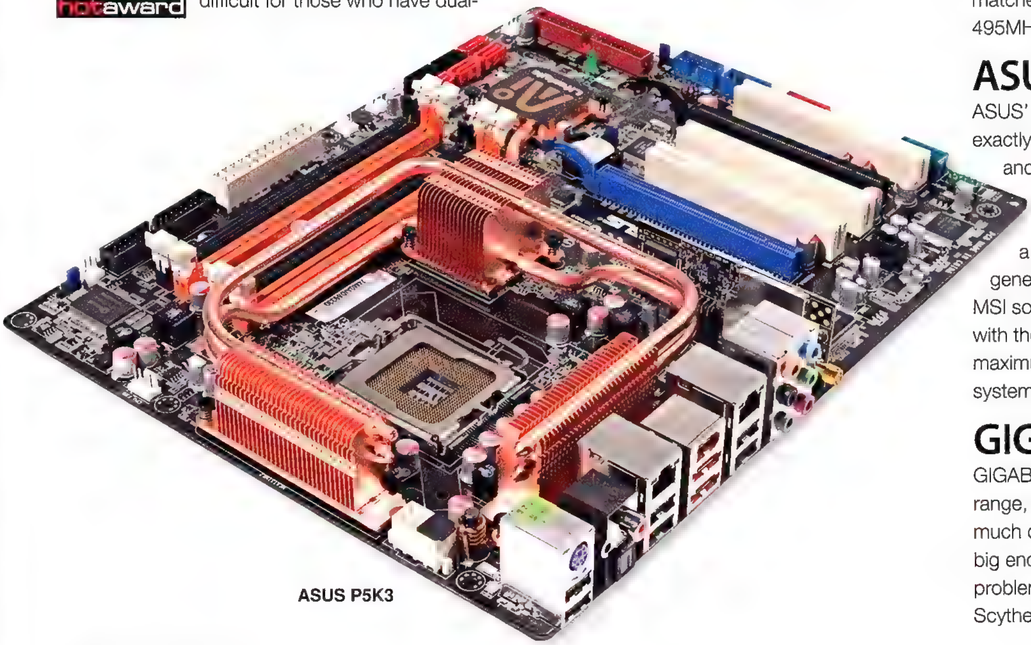
ASUS P5K

ASUS P5K

The ASUS P5K follows in the traditions of ASUS' well-known layout – which is a good thing, as it's darn near perfect. The IDE connector is potentially difficult for those who have dual-graphics solutions, and the clear CMOS jumper is obscured by having a single dual-slot card. Expect to lose four SATA ports if you've parted with the shekels to purchase an 8800 GTX Ultra – although a vanilla Ultra doesn't suffer from this problem.

ASUS has opted to drop the PS/2 mouse port too, and replace it with two USB ports, so you don't have to use extra headers on the board itself. The full six SATA ports are available on the interior, with a JMicron JMB363 chip powering two eSATA ports on the back and the single PATA connector. A Realtek RTL8110SC and Marvell 88E8056 handle the dual-gigabit Ethernet duties, while a Realtek RTL8187 handles the 802.11g built-in wireless. Sound is taken care of by the ADI1988B (with both coax and optical S/PDIF available), FireWire by the Agere L-FW3227 and the final auxiliary chip (wasn't the point of chipsets to include everything required?) is the Winbond W83627DHG-A, which handles legacy IO and monitoring functions. Solid capacitors are here in abundance, and the board displays ASUS usual dedication to build quality. Overclocking almost matched that of the previous 965 boards, hitting 495MHz Orthos stable.

> "ICH9... drops PS/2 and LPT support and allows eSATA ports to act as mulitpliers."



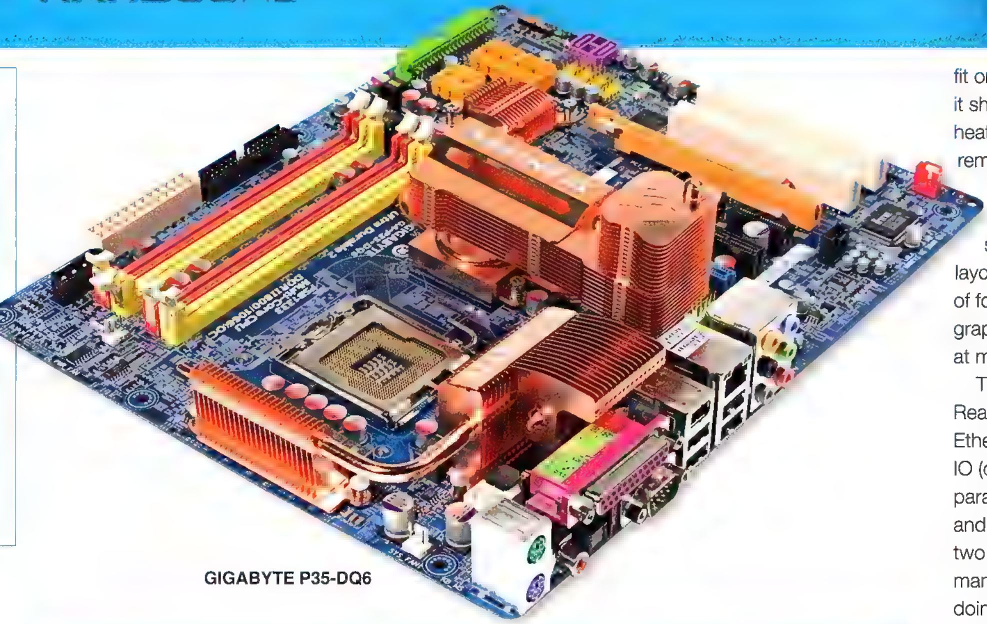
ASUS P5K3

ASUS P5K3

ASUS' P5K3 is for all intents and purposes exactly the same as the P5K, but supports DDR3 and comes with a slightly more elaborate heatpipe setup, suggesting the need to handle a bit more thermal stress. From a touch test the ASUS heatpiping certainly generated more heat than the Gigabyte and MSI solutions. The results below are taken with the RAM running at its default speed, the maximum overclock we could get out of the system being 485MHz on the FSB.

GIGABYTE P35-DQ6

GIGABYTE's P35-DQ6 is the latest in its DQ6 range, and is a beast indeed. In fact probably too much of a beast – the Silent Pipe heatsinks are big enough in height to cause potential clearance problems with CPU HSFs. Our reference Scythe Ninja with some wrangling managed to



GIGABYTE P35-DQ6

fit on the board with the fan facing the rear as it should. Another problem is the 'Crazy Cool' heat spreader on the bottom – while it can be removed, the northbridge cooler is left unsecured as a result, making us a little nervous. Those with coolers that require custom backplates should perhaps steer clear. The only other layout problem is you can expect to lose a whack of four SATA ports if you go the dual-slot, dual-graphics path – single-slot dual-graphics means at most you'll only lose one.

The rest of the board is excellent, with the Realtek RTL8111B managing the gigabit Ethernet, the ITE IT8718F looking after legacy IO (curiously GIGABYTE has still included the parallel and serial ports on the back by default) and monitoring, a JMicron controller dealing with two extra internal SATA ports on top of the six managed by ICH9, the Realtek ALC889A chip doing sound (with both coax and optical S/PDIF on the back) and finally a Texas Instruments TSB43AB23 chip controls the FireWire.

The P35-DQ6 takes home the honour of being the first board through *Atomic* labs to be able to hit 500MHz FSB Orthos stable. Mind you it wouldn't go any further, but this is a feat in itself. As with previous overclocking efforts on Gigabyte's 965-DS3P, we found letting the board choose its own voltages got better results than manual tweaking, making overclocking easy.

Final words

P35 really offers little to the consumer at the moment over 965 except for futureproofing. If you haven't made the jump to Core 2 Duo though, then these are definitely the ones to get.

Everest Ultimate Edition tests	OCZ Flex XLC 9200 @ 800MHz, 6-6-6-15	Corsair XMS3 @ 800MHz, 6-6-6-15
Memory Read (MB/s)	6043	6490
Memory Write (MB/s)	4864	4775
Memory Latency (ns)	86.0	76.1

	Gigabyte GA-N680SLI-DQ6	MSI P35 Platinum	Gigabyte P35-DQ6	ASUS P5K Deluxe	ASUS P5K3 Deluxe
wPrime 32MB (s)	29.890	29.625	29.609	30.594	29.687
SuperPiMod 1.5 (4M)	1m 45.406s	1m 41.484s	1m 42.265s	1m 42.797s	1m 39.984s
3DMark06	11844	11143	11137	11070	11109
Max FSB (MHz, Orthos stable)	478	460	500	495	485

DDR3

Of course the big attraction for P35 is twofold: Support for 45nm processors and on some boards, DDR3. To begin with, DDR3 will be much like DDR2 – that is slower than the preceding technology due to high CAS latency. Over time this should be solved by bumping up the clock speed of the sticks, with 1333MHz variants set to hit the shelves soon. Advantageously, DDR3 should consume less power – an 800MHz stick sucking around 20 percent less than an equivalent DDR2 stick (as it runs on a default 1.5V instead of 1.8V). Also an advantage is an eight-bit prefetch buffer, double that of DDR2. This functions as a sort of cache, allowing DDR3 to fetch data more quickly under certain situations.

DD3 is still 240-pin, but is notched differently so you don't go shoving it into your old boards, hacksaw-type activities excluded.

The DDR3 we were supplied with came from Corsair and was clocked at 1066MHz at 7-7-7-21. These ugly timings prevented us from performing an apples-to-apples comparison with DDR2, simply because every DDR2 board we tested didn't offer a CAS 7 option. Given that we clock down our OCZ Flex 9200 to 800MHz 4-4-4-12 for standard testing (the higher speeds left for our overclocking tests), we dumped the DDR3 down to a lower speed in the hope of reaching a lower CAS rating – and succeeded at 800MHz, 6-6-6-15 with little fuss. Matching our DDR2 to the same specs, the DDR3 wins out as you can see above, except in the write stakes. Until DDR3 hits lower CAS timings though, DDR2 will maintain performance dominance, with manufacturers suggesting DDR3 won't hit mainstream until it reaches 1600MHz. As it stands AMD doesn't plan to support it in its next chipset, so just like DDR2 it will be a while before the new standard catches on.

CORSAIR
XMS3
DDR3
PLATINUM SERIES

SCORE
MSI P35 Platinum
7.5 OUT OF 10

SCORE
Gigabyte P35-DQ6
8.0 OUT OF 10

SCORE
ASUS P5K Deluxe
9.0 OUT OF 10

SCORE
ASUS P5K3 Deluxe
8.0 OUT OF 10

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ViewSonic VX2835wm

Craig Simms wishes they'd spend a little more time in QA these days.

SPECIFICATIONS

Price **$1289** Street Price **$TBD**
Supplier **Viewsonic**
Website **www.viewsonic.com.au**
Specifications **28"; 1920 x 1200; 3ms; 1000:1 contrast ratio; HDMI; D-Sub; component; composite; S-Video, tilt adjustment.**

ViewSonic's latest foray into the monitor space is more TV than monitor. It doesn't even feature a DVI port, eschewing it in favour of HDMI – not that this is an issue, as a super handy DVI-to-HDMI cable is included to make hooking up your PC easy.

It looks like a TV too, and has no height adjustment, further pushing it into the category. What reveals it as a monitor though is its 1920 x 1200 resolution.

Then there's the speakers at the bottom. While certainly not the most stellar example of the zenith of sound, they're much better than the usual monitor speakers, if by pure virtue of their size. Things are a little muffled, and you get the impression the sound isn't projecting properly, requiring the user to up the bass – which unfortunately results in distortion.

If you intend to use these speakers rather than a discrete set – which we wouldn't advise – an interesting problem arises. It all comes down to you not being able to select your input sound source. Rather, it associates sound sources with video sources.

For instance, to get sound for composite video, you need to insert two RCA audio plugs into the composite section. Component has its own RCA jacks as well, although for using multiple video inputs this is actually a good thing. The issue lies with the 3.5mm sound jack, which is only active when you have a video signal going through D-Sub – this is a problem if you have a PC hooked up to the monitor through the DVI-to-HDMI convertor, as the monitor expects sound to be transferred only over HDMI – but of course is only receiving video. Only owners of the AMD HD2900XT will be able to use the monitor as intended in this circumstance. The final kicker is no sound will be reproduced if you don't actually have an active video signal.

> Movies were amazingly good, as was gaming, providing you ignore the wasteful preset modes...

The video inputs are great – as we've already mentioned, it features HDMI, VGA, component, composite and of course, S-Video. The most interesting here, oddly enough, is VGA, which looks sharper and better than it has any right to – Viewsonic has really delivered the quality here.

However it's on this mode and HDMI that another annoying little bug turns up – whenever you turn the monitor off, it forgets its sharpness settings, resetting them to a maximum of 100. Under HDMI, we found the ideal setting to be 60 as it kept things sharp without creating artefacts, while 100 looked awful. We hope this is fixed in upcoming firmware revisions of the panel, as it's certainly a show-stopper for us. The monitor has no issues with this through composite/component.

As an added bonus, component worked perfectly in 1080p using our Xbox 360.

DisplayMate revealed the ability to distinguish from 1 to 251 out of 255 shades on the greyscale tests, and on the colour ramps it showed the rare ability of not getting too dark too quickly. Movies were amazingly good, as was gaming, providing you ignore the wasteful preset image modes and settle for your own custom settings. Viewing angles are decent meaning a few people can join in on the fun, but Dell's 2707 was better in this regard.

The menu is easy enough to understand but navigation is a pain the arse due to the placement of the power button, which sits directly between the navigation buttons and the menu buttons. The monitor also takes a long time to turn on.

The box claims that video cables and audio cables are included, however at the time of review ViewSonic was unable to provide a finalised list of cables included. Included in our box was a DVI-to-HDMI cable, and bizarrely VGA-to-component.

The VX2835 is an excellent monitor with a few problems. Providing the sharpness bug is fixed, at $500 less and one inch more than the Dell 2707, it represents excellent value. So for now, a seven, and when that bug is fixed consider it an 8½.

SCORE
7.0 OUT OF 10

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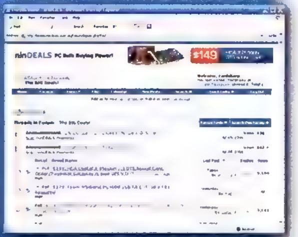

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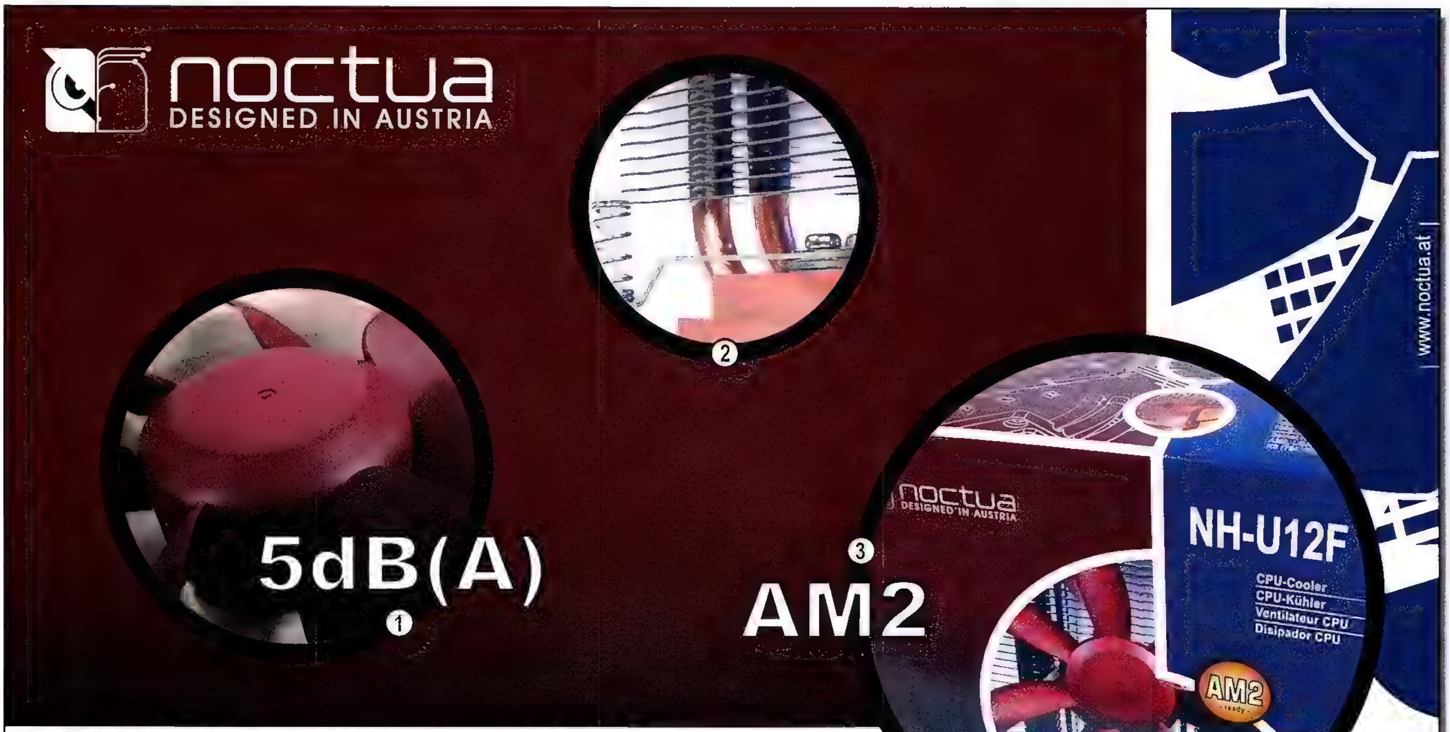

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Thermalright Ultra 120 eXtreme

SPECS

Price $95 **Street Price** $95
Supplier PC Case Gear
Website www.pccasegear.com.au
Specifications Socket 775; AM2 (with back plate, not included); 754/939/940 (with retention kit, not included); 790g.

Not to be outdone by the competition, Thermalright has improved yet again on its already excellent Ultra 120, with the Ultra 120 eXtreme.

The eXtreme manages to cram in six heat pipes compared with the four on the Ultra 120, while keeping the main heatsink the same size and retaining compatibility with 120mm fans.

Packaged inside the trademark Thermalright sturdy brown box and foam padding are the fan clips, some thermal paste, retention screws, a Socket 775 motherboard back plate and retention bracket for all AMD AM2 and Intel Socket 775 CPUs.

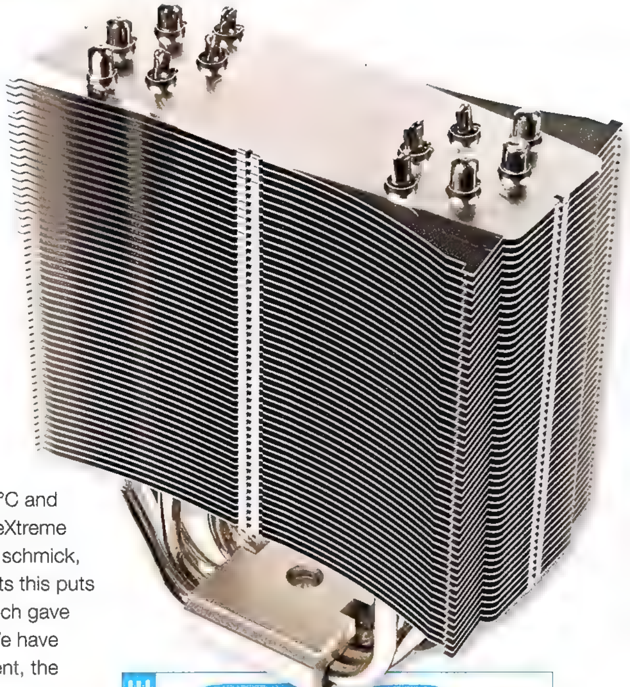
However AMD Socket 754/939/940/AM2 users will run into the same obstacles that previously presented themselves with the Ultra 120. This will require users to procure an AMD-compatible backplate for the eXtreme as it is not included.

An improved Socket 775 retention bracket is also included that folds with a scissor-like action. This means it can now easily fit through the heatpipes, an operation that previously involved painstakingly forcing the bracket in between the heatsink and surrounding pipes.

Despite stating compatibility with all 120mm fans we still ran into problems as the retention clips only work with fans that have separate screw holes on both sides of the fan. As a consequence, fans that have holes on both sides connected via a tube of plastic won't work here, and some ingenuity may be required.

Spreading thermal paste on our resident heat generator Chernobyl, in an ambient room temperature of 24°C and using a Noctua 120mm fan, the Ultra eXtreme managed 39°C degrees. This is pretty schmick, but considering the previous test results this puts it in line with the original Ultra 120, which gave a 42°C reading in an ambient 27°C. We have an inkling that inside a case environment, the eXtreme will really shine.

If every degree matters and you want the best possible CPU temps on air then the eXtreme is the best heatsink to get – at least until Thermalright raises the bar once more. **DV**



SCORE
8.0 OUT OF 10

CoolIT Systems Freezone

SPECS

Price $469 **Street Price** $469
Supplier CoolPC
Website www.coolpc.com.au
Specifications Socket 775/754/939/940/AM2; 92mm fan (with 120mm fan bracket).

The Freezone is CoolIT's first crack at the CPU cooling market, and it's definitely unconventional. The Freezone is an all-in-one, zero maintenance, pre-filled liquid cooling kit that uses air-cooled thermoelectric coolers with an in-built pump and 92mm fan to help cool the CPU. It comes with pre-installed tubing with coils attached to the CPU block, which CoolIT has dubbed the Fluid Heat Exchanger.

In the box along with the Freezone is a Thermal Control Module to power and control the fans, various retention bars for compatibility for all current Intel and AMD CPUs and a nifty little tool to help you install the Freezone inside your case. A 120mm fan adaptor kit is also included for those that have 120mm exhausts inside their case.

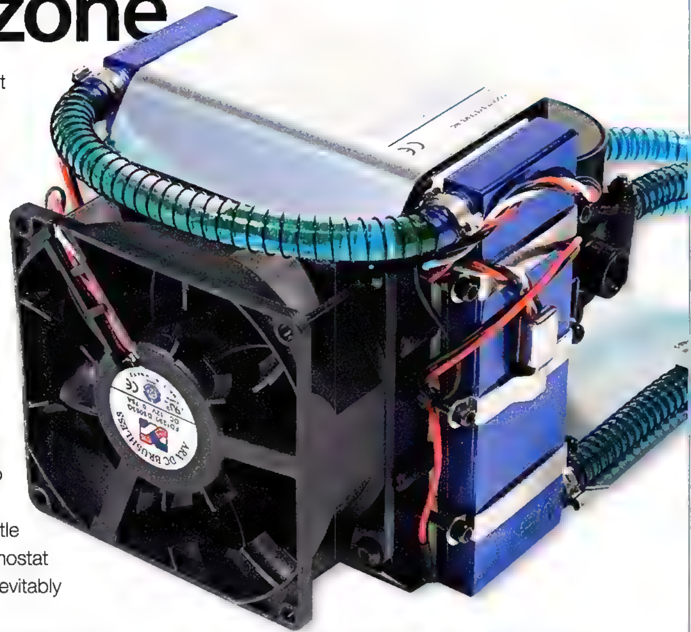
For those with AMD Socket 939 motherboards that are mounted upside-down or other unconventional case layouts, there may be problems with the installation due to the short tubing, which can't be modified thanks to the nature of the unit.

Putting the Freezone up against Chernobyl gave a temperature of 35°C in an ambient of 24°C on high setting using the pre-applied Freezone thermal paste, with the cooling temperature and fan controlled via thermostat on the TCM. As the cooler is controlled by thermostat, this means that below ambient temperatures are not possible with the Freezone.

Once Chernoybl got hot and toasty, the fan did get loud, although not to the point of insanity. An allen key is required to replace the stock fan, so if you're after silence you'll need to get a little creative with tools or set the thermostat to a higher tolerance, which will inevitably increase temperatures.

CoolIT also has control centre software in the works that will allow you to adjust power and fan settings via Windows. However at US$119 from its website the value of such software is questionable.

The Freezone is an ambitious attempt at fusing together thermoelectric cooling in a simple-to-use package. While managing to deliver excellent temperatures, the Freezone's price is prohibitive to all but the most crazy of cooling freaks, leaving the rest of us to invest our cash in high-end air-cooling, such as the Ultra eXtreme above. After all, an extra four degrees isn't worth $400. **DV**



SCORE
6.0 OUT OF 10

XFX GeForce 8800GTX Ultra XXX

SPECS

Price $1499 **Street Price** $1459
Supplier Multimedia Technology
Website www.mmt.com.au
Specifications DirectX 10; 675MHz core; 2.3GHz memory; 1.675GHz shader; 128 stream processors; 768MB GDDR3 384-bit memory.

Capitalising on its high-end domination, NVIDIA has released the 8800 GTX Ultra. It is the result of NVIDIA having a healthy six-month lead in front of AMD to refine yields and push the clocks higher. The consequent card grasped firmly in our semi-evolved metacarpi this month is the XFX GeForce 8800GTX Ultra XXX Edition.

Coming in at 675MHz core and 2300MHz effective memory, XFX's beast runs 63MHz and 140MHz above a normal Ultra, and in turn 100MHz and 500MHZ faster than a standard GTX. Even the shader clock has been tweaked to 1675MHz, up from the Ultra's 1500MHz and 1350MHz in the GTX.

A new cooler makes this possibly the sexiest video card this side of EVGA's enshrouded KO edition cards – and is still quiet. At idle, the card sits at 61°C, while at load it manages to peak 81°C. Worryingly at stock speeds consistent artefacting was present in ATITool's 3D view, suggesting the clocks may be pushed too hard. While nothing noticeable turned up in our game tests, this is concerning nonetheless.

3DMark06 SM 3.0 scored 4372, 3558 and 3156 at 1280 x 1024, 1600 x 1200 and 1920 x 1200. Using the same respective resolutions the ancient Half-Life 2 managed 226.09, 205.24 and 188.24fps, and Call of Duty 2 yielded 65.831, 63.678 and 59.247fps. A normal GTX by comparison scores 3501, 2853, 2515 in 3DMark06, 193.53, 175.74, 160.81fps in Half-Life 2 and 66.828, 55.52, 50.884 in Call of Duty 2, the last results suggesting our custom benchmark is starting to become CPU bound at lower resolutions.

This is without doubt the most ball-busting card on the market, smacking the competition out of the park. Unfortunately it means it attracts an utterly ludicrous price tag, one more worthy of a 3D workstation GPU than something intended for gaming. At the time of writing a normal Ultra can be had for around $1050, and a vanilla GTX can be found for about $800. The performance cannot be denied, which has saved the score – however the performance doesn't double, despite being close to twice the price. If you need to go top dog, be sensible and get a normal GTX. **CS**

SCORE **7.0** OUT OF 10

Intel Core 2 QX6800

SPECS

Price $1899 **Street Price** $1865
Supplier Intel
Website www.intel.com
Specifications Socket 775; four cores; 2.93GHz; 2MB cache per core; virtualisation; 65nm.

It was bound to happen – given that the QX6700 would happily go up to a multiplier of 11, it was proven that Intel's quad-core could reach 2.93GHz from 2.66GHz, paving the path for an official release – the QX6800.

With it comes all the Core 2 goodness we now know and love, although being an Extreme Edition chip it attracts a gargantuan price tag as well.

There's nothing new here short of the bumped speed – it still features virtualisation, runs on a 1066MHz bus, 2MB cache per core and clock for clock beats the living pants off AMD's current competitor.

Plugging it into our standard EVGA 680i motherboard with a 150GB Raptor and 2GB of OCZ Flex XLC 9200, it scored 1m 42.875s in SuperPi (4M digits), 1524CB in Cinebench, 52s in Lame-MT (icl variant, --alt-preset extreme settings with a 30m WAV file), 2m 24s for VirtualDub (compressing a 1GB raw AVI to 1300Kb/s XviD) and 6m 39s in WinRAR (compressing the same 1GB raw AVI file using standard compression). This is compared to 1m 42.942s, 1318CB, 57s, 2m 34s and 7m 33s for the same respective benchmarks on a QX6700. While SuperPi barely benefited, everything else gained a significant boost – although compared to an X6800 the chip was only one second faster in VirtualDub and LameMT, indicating the multi-threading isn't massively advantageous beyond two cores.

Those who are sensible in the home market will simply get a lower-priced dual-core processor and ramp the FSB until the other components can't take it any more (as most will happily hit 3GHz) – however for business users, those who require intact warranties, simply don't like messing with systems or outright need the benefits of four cores in the one CPU, then this thing is the very best you can get. **CS**

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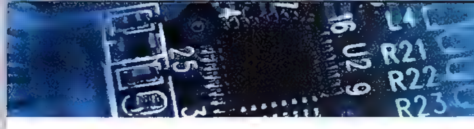


ATOMIC KITLOG

Our choice for the best gear the land has to offer

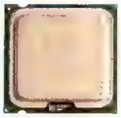
There's nothing sexier than new kit. And whether you need to horde your pennies (Budget), want the most power for your dollar (Performance) or own a small mansion and a collection of sports cars (Extreme), we're here to help with this handy matrix of *Atomic* recommended products. You may find your needs fall between categories – that's okay, just mix and match to suit your budget! Each piece of kit has been reviewed hands-on in *Atomic*, so if you want to learn more, look up the issue and page number listed.

CPUs | Motherboards | Memory | Video cards

BUDGET

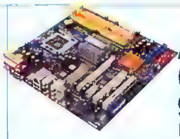
I can't afford to eat... gimme gear!

intel



Intel Core 2 Duo
PRICE $200-$480

Stretch a little further and buy yourself a Core 2 Duo – you'll be thanking yourself later. The E4300 is the cheap ticket to speed, at $200.



ASRock Conroe 945G-DVI
PRICE $113

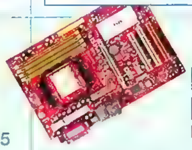
ASRock's budget board may be using old technology, but it runs the new stuff just fine, and can even overclock a little.

Reviewed in *Issue 70 – Page 60*

AMD

AMD Athlon 64 AM2 X2
PRICE $135-335

Cheap CPUs are a wonderful thing, and the X2s are now wonderfully cheap. The 3600+ LV is your budget baby at about $135.



MSI K9N Neo F
PRICE $113

Excellent performance from a budget board, with plenty of legacy slots for upgraders. Don't expect to overclock though.

Reviewed in *Issue 68 – Page 33*

Memory

Corsair Twin2X 1024MB 6400 Pro
PRICE $198

Corsair has a history of providing nice, stable and fiesty sticks of random access memory joy. These RAM sticks are EPP compliant, have low latency and are nicely overclockable. 800MHz of fun for everyone!

Reviewed in *Issue 69 – Page 51*

Video cards

Powercolor X1950 Pro
PRICE $245

The X1950 Pro is nothing short of fantastic. Mind you, this could just as easily be the 7950GT, so watch this space in case the NVIDIA card drops in price.

Reviewed in *Issue 71 – Page 47*

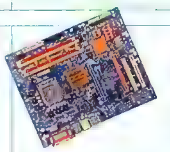
PERFORMANCE

Hardware that brings the best for buck.

intel

Intel Core 2 Duo
PRICE $200-480

Core 2 Duo – crazily fast, crazily cool, crazily affordable, overclockable like buggery. The E6420 is the best buy, at about $300.



Gigabyte GA-965P-DS3P
PRICE $204

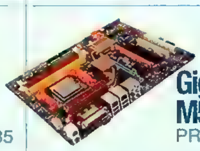
The 965P-DS3P is a ridiculous overclocker that can't be ignored. Buy a low-end Core 2 and go nuts!

Reviewed in *Issue 74 – Page 46*

AMD

AMD Athlon 64 AM2 X2
PRICE $135-335

The X2 series are still fantastic chips, and in the face of the Intel threat are now going for cheap. The 6000+ is your current sweet spot at about $335.



Gigabyte GA-M59SLI-S5
PRICE $250

Gigabyte delivers yet another affordable, feature-filled wonder of the 21st century.

Reviewed in *Issue 66 – Page 39*

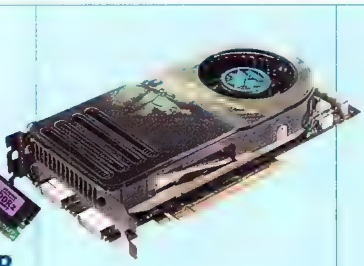
Memory

Corsair Twin2X 2048MB 6400 Pro
PRICE $350

Yes, these are the same sticks recommended for the Budget system. Sadly, they are also the only RAM sticks we've tested that are compatible with AM2 and Conroe. So until we get more in, the Corsairs will stay.

Reviewed in *Issue 69 – Page 51*

Video cards



GeForce 8800GTS 320MB
PRICE $410

DirectX 10 for the mainstream. 320MB is as good as 640MB in most situations – opt for the 640MB if you're going to play above 1600x1200.

Reviewed in *Issue 76 – Page 58*

EXTREME

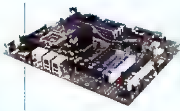
Gimme power. Money is no object.

intel

Intel Core 2 Quad QX6800
PRICE $1865

Now on par with the fastest dual-core, Intel's top of the line quad-core part is feisty and powerful.

Reviewed in *Issue 78 – Page 59*

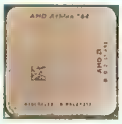


EVGA nForce 680i
PRICE $435

Stupidly over-featured and fast, if you've got the cash, then plonk it down here.

Reviewed in *Issue 72 – Page 47*

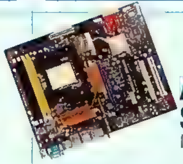
AMD



AMD Athlon 64 FX-62
PRICE $1072

Sadly gets beaten by a mid range Core 2 Duo, but still the top of AMD's pile.

Reviewed in *Issue 66 – Page 39*



ASUS M2N32 SLI Deluxe
PRICE $290

Perfection in a motherboard. Beautifully laid out and overclockable to boot.

Reviewed in *Issue 68 – Page 35*

Memory

Corsair Dominator Twin2X 10,000
PRICE $1016

Crazy speed sticks that will also happily do 1T/800MHz/3-3-3-3. Comes with a fan attachment to keep things cool!

Reviewed in *Issue 77 – Page 58*

Video cards

XFX GeForce 8800GTX Ultra XXX Edition SLI
PRICE $1459x2

This is far and away the most powerful graphics card on the market, but be willing to sacrifice your entire retirement fund for the privilege of having one of these tearing up your screen.

Reviewed in *Issue 78 – Page 59*

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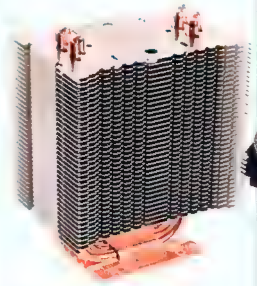
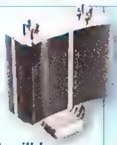
Coolers



Noctua NH-U9F
PRICE $80

It may only be 90mm, but its cooling power is exemplary, coming in only slightly behind its 120mm brother.

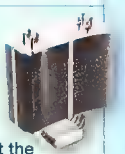
Reviewed in *Issue 72 – Page 42*



Thermalright Ultra 120
PRICE $75

Tower cooling that will keep your tower cool. Whack a Nexus 120mm fan on for near silent cooling.

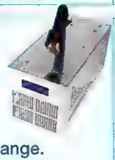
Reviewed in *Issue 72 – Page 42*



Thermalright Ultra 120
PRICE $85

Make sure you get the optional AM2 bracket (hence the higher price). Grab that same Nexus fan.

Reviewed in *Issue 72 – Page 42*



Asetek Vapochill Lightspeed
PRICE $1020

Vapour phase change. Ooooh. Vapour. Phase. Change. No matter how many times you say it, it's still cool (pun!)

Reviewed in *Issue 64 – Page 38*

Cool-Trek Vostok
PRICE $199

Until more extreme cooling systems come along that are AM2 compatible, this little kit will have to fill the gap. Make sure you get the updated mounting kit.

Reviewed in *Issue 68 – Page 41*

System drives

Samsung HD160JJ 160GB
PRICE $80

Super quiet and yet still fast, the 160GB Samsung offers excellent value for money.

Reviewed in *Issue 69 – Page 40*

Seagate Barracuda 7200.10 320GB
PRICE $130

Seagate's fancy new technology makes this beast both fat and fast. Mmm, toasty.

Reviewed in *Issue 69 – Page 40*

Western Digital Raptor WD1500ADFD
PRICE $330x2

Dear lord. The performance king hath cometh, short of whacking in a SCSI. Buy two and RAID 'em.

Reviewed in *Issue 62 – Page 40*

Displays

Samsung 931C
PRICE $405

2ms of raging colour gamuts and beautifully smooth tonality that will make you weep with joy and hug strangers.

Reviewed in *Issue 70 – Page 56*

Samsung 244T
PRICE $1477

Brilliance at 24", the 244T offers 6ms gaming, a wonderful gamut and more inputs than an alien hooker.

Reviewed in *Issue 69 – Page 48*

Hewlett Packard LP3065
PRICE $2718

Thirty inches, 2560 x 1600, 8ms G2G. If you can handle the size and cost to run this massive beauty, you won't be disappointed.

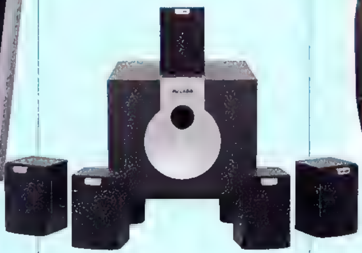
Reviewed in *Issue 76 – Page 53*

Speakers

Steelsound 5Hv2
PRICE $120

Awesome gaming audio performance on a shoestring budget. Phenomenal 'phones.

Reviewed in *Issue 73 – Page 43*



AVLabs AVL325
PRICE $165

While it can't hold a candle to the Z-5500D, with a price this low there's no excuse not to jump to 5.1.

Reviewed in *Issue 64 – Page 50*

Logitech Z-5500D
PRICE $430

Able to play the 'liquid gold' that is DTS 96KHz/24-bit, this 5.1 beast can wreck both home and hearing alike with equal impunity.

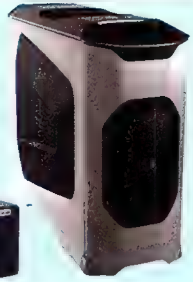
Reviewed in *Issue 48 – Page 56*

Cases

Cooler Master Ammo 533
PRICE $92

Perfect for LANs with its heavy duty handle, military styling and rugged construction, the Ammo blasts the budget competition away.

Reviewed in *Issue 60 – Page 50*



Cooler Master Stacker 830
PRICE $290

Like the Stacker before it, this sensational Stacker stacks sumptuous specifications salaciously.

Reviewed in *Issue 61 – Page 36*

Silverstone TJ07
PRICE $420

The Silverstone Temjin TJ07 is a huge hulking beast that shows you mean business in the finest style. Impeccable finish and plenty of room means win.

Reviewed in *Issue 65 – Page 49*

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Dan talks tech
like you've never
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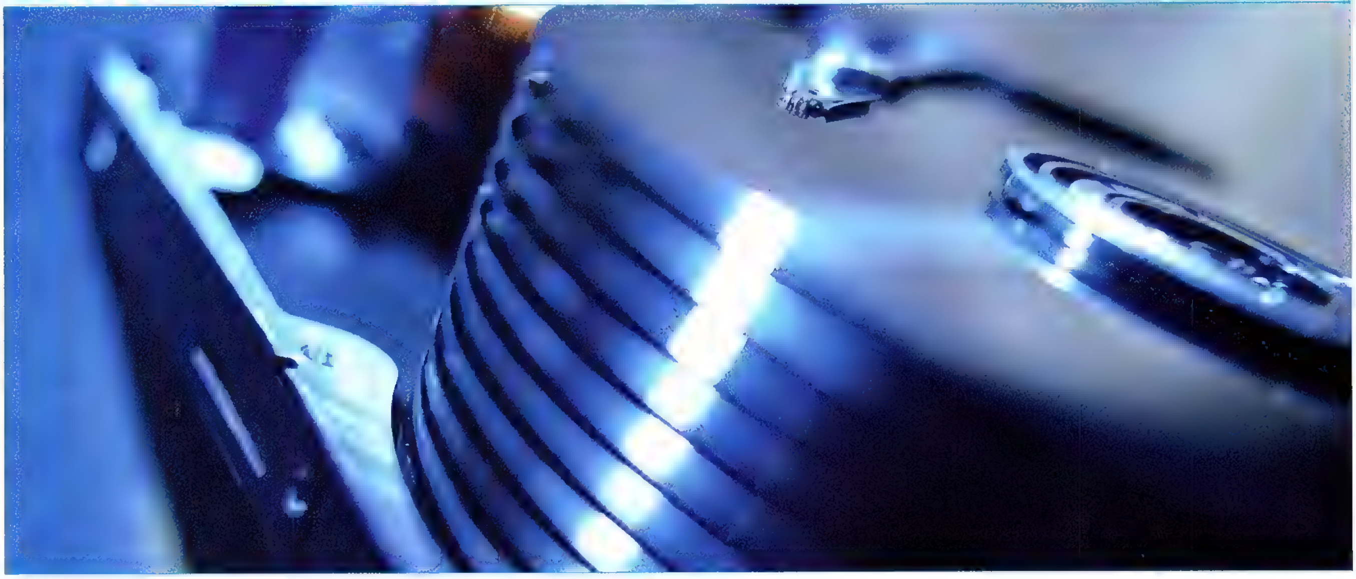


Grease and a hard drive change

Daniel Rutter's PC has five years left to live.

You know how mechanics put a little sticker in the corner of your windscreen to remind you when your car will need another service? Hard drives should come with something similar. Because, one way or another, all hard drives are going to die.

Personally, I start feeling nervous about my drives when they hit their second birthday. As they've then spent almost all of those two years cheek-by-jowl with other drives in the disk-farm PCs I favour, this is not *entirely* irrational – but, thanks to a couple of recent studies, I now know that it's less rational than I thought it was.

> Hard drive failure rates are much higher than the manufacturers glibly allege.

Google's study of more than 100,000 drives over five years (**tinyurl.com/2wkvbc**) is useful as much for what it says about how hard it is to figure this stuff out, as for what it actually found.

It turns out that working drives hard, or running them warmer than recommended, doesn't seem to have much of an impact on their life. And the popular idea that failures follow a 'bathtub curve', in which any drive that doesn't die in the first three months is likely to live for five years, also seems to be invalid. Drives actually just slowly wear out over their lives, like other mechanical devices.

A similarly huge Carnegie Mellon University study (**tinyurl.com/2sf9lt**) reached the same conclusion. Both studies also found that the very long lifespans indicated by hard disk manufacturers' 'million hour' mean-time-between-failures figures (MTBF) do not, in fact, indicate that any real drive is likely to last for anything like a million hours of operation – that's 114 years!

You can look 'MTBF' up on Wikipedia to see why it's not meant to be taken as an actual lifespan estimate. But even using standard MTBF analysis, drive failure rates are much higher than the manufacturers glibly allege. Annual replacement rates (ARRs) are usually specified as being well below one percent, but they can actually be above 10 percent.

If you have a 0.5 percent ARR drive – pretending, for simplicity, that the rate doesn't change over time – then it's very likely (97.5 percent) to still be alive after five years. If you have a five percent drive, though, then there's a 23 percent chance it'll die in its first five years. If you have a 12 percent drive, it's more likely to be dead after five years than it is to be alive.

You can only figure these numbers out for a given model of drive at the *end* of the period, of course. Different drive models vary in reliability, but despite the devout beliefs of various geeks about different manufacturers' products, there is no detectable relationship between brand and reliability either.

On balance, though, I now think it's perfectly reasonable to give your drives three years before you replace them. Four years is OK for penny-pinchers, and five years or more should be fine for Aunt Nora's PC that's only turned on for two hours a week.

When you reach the end of that period, whatever that may be, it's time to put aside an evening for plugging fresh drives into the computer and imaging the old drives across, using some flavour of Norton Ghost or the freeware DriveImage XML or something.

If you have more than one hard drive, by the way, and your update leaves you with your drives in a different order, then you're likely to get a terrifying boot error when you reset the computer. Windows, for instance, will bleat about not being able to find HAL.DLL or something.

That error just means that your new boot disk is not first in the boot order any more. Just fix that in the BIOS setup program and you'll be off and away.

Oh, and if you have a multiple-hard-drive computer, it also pays to label the drives on whatever side faces out when the case is open.

I use a silver pen.

Stop laughing.

Fortunately Dan's brain has a (slightly) longer MTBF than his hard drives.

dan@atomicmpc.com.au

GIGABYTE P35 Series Motherboards Featuring Ultra Durable 2 Design

Supports intel Core 2 Quad Inside

intel P35 EXPRESS CHIPSET

Intel P35-based motherboards from GIGABYTE feature high quality, highly efficient components designed to provide maximum durability for today's high performance motherboards

FSB1333 Support | Quad Core Optimized | CROSS FIRE

GIGABYTE Ultra Durable 2

In 2006, GIGABYTE launched their Ultra Durable series of motherboards, setting the industry standard by being the first motherboard maker to employ All-Solid Capacitors on a wide range of top-to-bottom products. This year, GIGABYTE is setting a new industry standard with their Ultra Durable 2 Series motherboards, featuring Low RDS(on) MOSFETS, Ferrite Core Chokes and All-Solid Capacitors for their upcoming Intel P35 motherboards. So, what do these new components do and what are their benefits?

Using high quality components on a motherboard is the key factor for having a long lasting, stable and reliable product. This is especially the case for the power circuit design, which features the most critical components of a motherboard.

Ultra Durable 2
Low RDS(on) MOSFET
Ferrite Core Chokes
All-Solid Capacitor

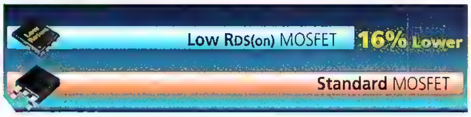
Quality Components make Quality Motherboards

① Low RDS(on) MOSFET
② Ferrite Core Chokes
③ Solid Capacitors

10°C↓
Ultra Durable 2
(without heat pipe)

CPU zone temperature test

Ultra Cooling

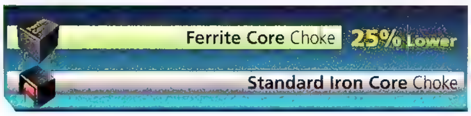


Low RDS(on) MOSFET Design

A MOSFET (Metal Oxide Semiconductor Field Effect Transistor) is a switch that allows or stops electric current to pass through an electric circuit. If the CPU is requesting power, the MOSFET acts as an "on" switch and allows the power to travel through the power circuit. If the power circuit is in a discharge state, the MOSFET will then act as an "off" switch, stopping the current so the circuit can discharge the power in the system before additional current is allowed to pass through.

GIGABYTE Ultra Durable 2 motherboards utilize Low RDS(on) MOSFETs. These differ from regular MOSFETS in that they are specially designed to produce lower switching resistance and utilize lower power consumption. The result is faster electric current charging and discharging and less heat generation.

Low Power Loss

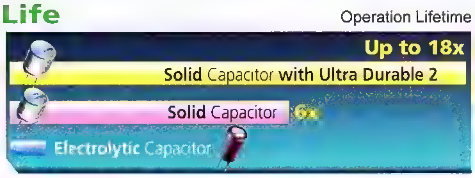


Ferrite Core Choke Design

If the MOSFET is in the "on" state, the current will then flow to the choke. A choke is an inductor that stores energy and allows Direct Current (DC) to pass through while blocking Alternating Current (AC). Choke coils help to prevent electromagnetic interference (EMI) and radio frequency interference (RFI) from the power supply from interfering with the power circuit.

Instead of using regular chokes, GIGABYTE Ultra Durable 2 motherboards feature Ferrite chokes that are comprised of a compound of iron-oxide and other metal elements. These metal properties hold energy much longer than common iron-core chokes at high frequency, resulting in lower power loss.

Longer Life

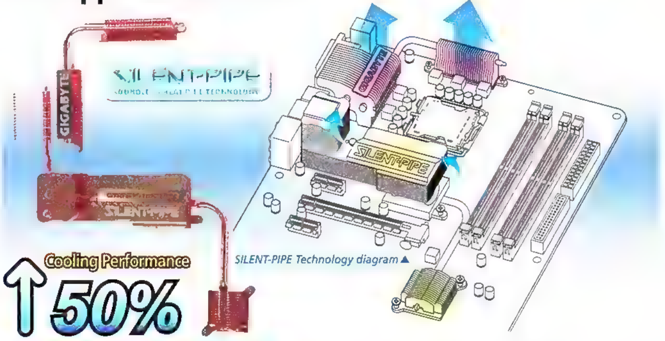


All-Solid Capacitors Design

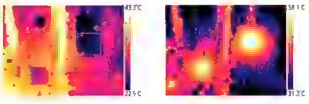
From the choke, the current then passes through a capacitor. The capacitor stores electricity and delivers it to the component requiring power such as the CPU.

GIGABYTE uses Japanese manufactured solid capacitors to deliver maximum stability, reliability and longer system lifetime for general PC usage as well as for improved overclocking performance.

All Copper SILENT-PIPE



SILENT-PIPE Technology diagram ▲



With SILENT-PIPE Without SILENT-PIPE

The GIGABYTE P35 Series also feature the all new copper GIGABYTE SILENT-PIPE thermal solution* covering the north bridge, south bridge and CPU power MOSFETs. This new design helps to dramatically reducing the general CPU zone temperature. In fact, the new GIGABYTE SILENT-PIPE enhances cooling performance up to 50%

GIGABYTE P35 Series

The next generation platform for 45nm Intel® Multi-Core Processors

Without a doubt, the GIGABYTE P35 Series deliver the very latest in high performance computing. Providing exceptionally high levels of overclocking performance, the GIGABYTE P35 Series features the Intel P35 chipset, with optimized system memory capabilities and chipset overspeed protection removed. Additionally, the GIGABYTE P35 Series supports the latest multi-core processors up to FSB 1333MHz, including the upcoming 45nm platform, with its record breaking performance and greater energy efficiency.

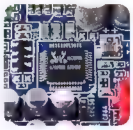
The GIGABYTE P35 Series offer options for both DDR2 1066 and DDR3 1333 memory support*, providing scalable options for users wanting to take advantage of higher memory performance with less power consumption to run next generation applications such as high-definition video and 3D visualization.

DDR3 1333 DDR2 1066

The GIGABYTE P35 Series also includes options for those wanting ATI CrossFire™ support*, providing dual PCI Express connectivity for high performance, high-definition entertainment platforms.

45nm Intel Core™ 2 Quad processor
Supports Core™ 2 Quad / Core™ 2 Duo with FSB 1333
Core 2 Quad
intel

ALC889A with DTS Connect Excellent Audio Performance



The GIGABYTE P35 Series also feature the Realtek ALC889A equipped with a high-performance DAC (Digital-Analog Converter) with 106 dB Signal-to-Noise ratio playback quality, designed especially for Windows Vista Premium PCs.

Blu-ray/HD DVD Full Rate Audio Support

Blu-ray/HD DVD
Full Rate Lossless Audio

The ALC889A also enables high quality Full Rate Lossless Audio for content protected media and support for both Blu-ray and HD DVD formats for an exhilarating home theater entertainment experience.

7.1+2 Channel High Definition Output

The ALC889A provides support for 7.1 sound playback, plus 2 channels of independent stereo output (multiple streaming) through the front panel stereo outputs.

dts Connect
For DQ6/DS4 Series Models

---

*GA-P35T-DQ6,GA-P35T-DS4,GA-P35-DQ6 and GA-P35-DS4 feature the GIGABYTE SILENT-PIPE thermal solution
*The GA-P35T-DQ6 and the GA-P35T-DS4 support Dual Channel DDR3 memory, while the GA-P35C-DS3R supports DDR2 or DDR3 memory for flexible scalability
*The GA-P35-DQ6, GA-P35T-DQ6, GA-P35-DS4, GA-P35T-DS4 and GA-P35-DS3P feature ATI CrossFire™ support

For more information on the GIGABYTE P35 Series and GIGABYTE Ultra Durable 2, please visit the GIGABYTE website at:
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GAMEPLAY

GAMES, GAMING AND GAMERS COVERED ATOMIC-STYLE

Games are out in force this month. We have your online needs covered with Myst Online; everything superhero-related is taken care of by Spider-Man 3; God of War 2 capably handles the action side of the proceedings and War Tech: Senko no Ronde is perfect for those who don't know what they like.

Along with the reviews, we have some great coverage of Auran's upcoming MMO Fury. You may remember a little game called Dark Reign, and how crazy a success it was. Yeah, that was Auran. We have a feeling it'll be able to rejuvenate its former greatness with Fury, and you can find out the details starting from page 68.

GAMEPLAY CONTENTS

Engine Room: Fury 68
A look at the Australian MMO that could finally be the answer to World of Warcraft's dominance. Find out how developer Auran plans to make it happen.

Geekette 86
Kate Inabinet is not as epic as she used to be.

Game reviews

Myst Online 74
Spider-Man 3 76
God of War 2 78
War Tech: Senko no Ronde 80

Culture Shock reviews

28 Weeks Later 83
Nerds FC 84
Shogun Assassin 84
Le Chevalier D'Eon 84

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Guys like you and us playing a game of football. Outside. And running around. Lots of running. Sounds like an impossible feat? Not so. *Nerds FC* will show you that three months of hard training with 14 of the nerdy geeks, you can create a football team. Just don't expect them to win much.

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Thanks again to Madman ([illegible]) for supplying us with this great prize.

FAST *and* FURIOUS

Logan Booker goes toe-to-toe with Auran on the developer's feisty MMO Fury.

Unleash the Fury. Only words, yes, but they are more profound than one would first give them credit for.

If you're wondering where we found this collection of letters arranged in striking prose, it was not in a chest at the bottom of the sea or one of those poorly designed 'Memorable quote' websites; you need only venture to **unleashthefury.com** – the online home of Australian developer Auran's upcoming massively multiplayer title Fury.

Even without specifying who should unleash said fury, and at what, the words are clearly a challenge; a virtual gauntlet thrown onto the electric battlefields of cyberspace, where MMOs fight fiercely for subscribers. A fiery disc, marked with cryptic symbols and an emblazoned 'F' in its centre serves as a logo, its hypnotic spin as defiant as it is mysterious. Doubtless, grown men shiver under its shadow and woman fight nail, tooth and 3-inch heel to be in its presence. We're not that fond of shadows (they can be chilly on winter days), but it looks imposing enough to warrant such reactions.

Spurned perhaps by the rapid growth of the MMO market and the seemingly unstoppable success of Blizzard's World of Warcraft, the Brisbane-based Auran has taken up the daunting task of placing Australia on the MMO map. Founded in 1995 in the unquestionable sunny state of Queensland, Auran is one of the last great Oz developers.

Auran carved its name into the scene with its first release in 1997, the real-time strategy title Dark Reign. The game proved to be a critical success, scoring a 9.2/10 from GameSpot and 89 out of 100 from PC Zone in the UK. During its many years in the spotlight, DR was mentioned in sentences beside 'Warcraft', 'Command & Conquer' and strangely, the word 'Orange'.

Oranges aside, Auran had shown the entire world – well, gamers anyway – that it could make a *bloody good* game. If this past masterpiece is anything to go by, then Auran is about due to unleash its fury onto the gaming world again.

A massively multiplayer online title that's actually called 'Fury' is as good a start as any and should, at the very least, be associated fondly with a variety of citrus fruits in the years to come.

ROLES TO PLAY

'Fury … focuses purely on PvP action,' states Adam Carpenter, Fury's lead designer. PvP, or Player versus Player, is a type of gameplay that pits one human against another. The term is used almost

exclusively in the MMO gaming space – which gave birth to the acronym – and involves role-playing or customisation elements that separate it from games such as Counter-Strike. PvP MMOs are also based in a persistent world where one's achievement, earned abilities and equipment are stored indefinitely, allowing the player to pick up where they left off.

Another variety of MMO, called Player versus Environment is similar, and departs only in the fact that a PvE game has human players working together against a computer AI.

'Most MMOs in the current market are PvE-PvP hybrids that provide PvP through designated areas or PvP systems that are tacked on and generally aren't really well thought out. As Fury is focused purely on PvP, we've been able to avoid a number of the pitfalls and design issues that plague PvE-PvP hybrid games such as high-end PvE content providing items and abilities that prevent other players from competing effectively,' explains Carpenter.

Auran wants to do more with Fury than just create a pure PvP MMO, it's looking to forge a new genre of game – something that hasn't been attempted by another developer in a very, very long time.

To give some perspective: Games such as id's Wolfenstein 3D and Westwood Studios' Dune II gave rise to the first-person shooter (FPS) and real-time strategy (RTS) genres respectively. Both games are over a decade old.

'With Fury, we wanted to create something new and fresh. We didn't want to make yet another WoW/EverQuest clone whose success would be primarily driven by the project budget,' says Carpenter.

'Fury accomplishes this by combining the customisation and character building of RPGs with the speed and action of FPS games. We've coined the term "Massive Multiplayer Online Third Person Slasher" or MMOTPS – we think it fits the new genre pretty well.'

The team was unanimous in its opinion of current MMOs and their varying implementations of PvP combat: They sucked. Carpenter admits that a few have come close, such as Shadowbane and Dark Age of Camelot, but none have hit on the best formula. With nothing but PvP on the table to balance, Carpenter believes Auran can avoid the troubles other games have faced, like PvE-specific abilities with no use in PvP or 'ganking' – wherein one player kills another unfairly while they attempt to complete PvE objectives.

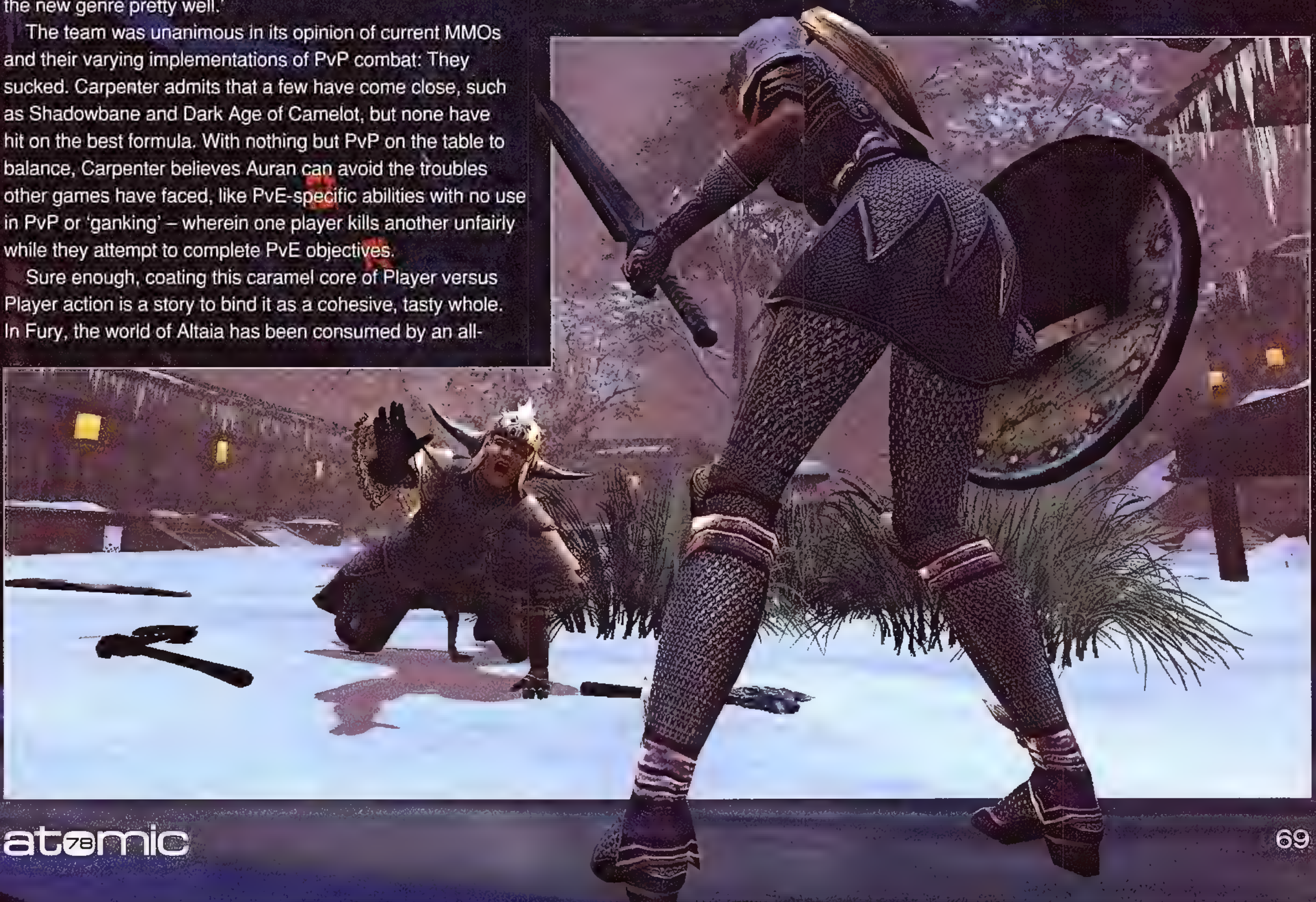
Sure enough, coating this caramel core of Player versus Player action is a story to bind it as a cohesive, tasty whole. In Fury, the world of Altaia has been consumed by an all-powerful entity known as the 'Fade'. Carpenter describes it as a 'black hole-like force' that happily devours whatever it comes into contact with. Much like a real-world black hole denies even light an escape from its pull, the mystical Altaia is deprived of magic by the never-satiated hunger of the Fade.

'The Fade was brought on by the Altaian's reckless use of magic. Their use was so detrimental to the world that the gods who provided magic abandoned the Altaians,' says Carpenter. 'The only way to resist the Fade is to gather Essence from the war zones [which serve as in-game combat arenas]. Each realm is fighting over the scarce resource, so it's up to you to help your realm gain more Essence and therefore survive.'

FIGHT THE RIGHT FIGHT

As with any MMO, Fury revolves around character progression, and it can be argued that along with the

Above A big axe is always very helpful.
Below Show your enemies no mercy.



Above That's a critical hit if we ever saw one…
Below Not the most practical of armour.

enjoyment of playing the game itself, the ability for a player to watch their in-game personality grow stronger and gain access to more powerful skills and spells is a big drawcard. Fury employs ranks – of which there are ten – instead of traditional levels, to reflect the relative strength of a character.

'Fury is a competitive game, so we've kept the total number of ranks quite low,' explains Carpenter. 'In fact, increasing your avatar's rank doesn't confer any direct increase in power or health. Instead, each rank provides you with more equip points that you can use to customise your incarnations. Thus higher ranks allow your incarnations to be more diverse or more specialised on whatever path you prefer.'

Once a player achieves a higher rank they are free to compete with other players of the same rank and make use of the new abilities the rank entails. Alternatively, players can lower their rank to one they have previously gained. The advantage of this is a simpler experience; a player may feel that they are most comfortable at a certain difficulty level, or perhaps would like to spend more time at a lower rank before advancing. This somewhat replicates the 'alt' or alternative character phenomenon of games such as World of Warcraft, where the player can create a new character to repeat lower-level content, or experience the game from the perspective of another class.

In Fury … you can set any of your incarnations to be any rank you have achieved, so if you want to play at a lower rank you can. This gives players the ability to attain the same end result as they would with alts without forcing players to grind through the same repetitive content again and again. Additionally, players gain the benefit of being recognised for who they really are, not which alt they happen to be playing the most,' says Carpenter.

The heart of Fury's gameplay consists of teams of players fighting competitively in specially-designed arenas. This service is moderated by non-player characters called 'Astralists'. Carpenter describers them as a gateway to Fury's matchmaking system, designed to keep games fair by preventing better-equipped and higher ranked players from fighting opponents that would stand little chance against them.

'This is great all around, as it ensures that pro clans fight other pro clans and pick-up groups fight other pick-up groups,' he says.

CLIMBING THE LADDER

Essentially, players gain higher ranks by slaying opponents in battle. Carpenter however says that there's more to it than just cutting down swathes of enemies.

'The best way to advance is to play with your team and ensure that you and your team are all playing to win. "Play to win" is of course specific to each of the four game types as Bloodbath, Elimination, Vortex and Fortress all have vastly different goals, objectives and play styles.'

Not all players will want to hang around at the lower ranks – most will race to the maximum rank of 10. But what can they expect when they get there? What would normally signal the end of a game is just the beginning for an MMO, and is known as the 'end-game' in online parlance.

'Very commonly a player hits the level cap and the game changes completely,' says Carpeneter. 'With Fury, the longer you play, the more you move into deeper levels of tactical and strategic gameplay. You aren't forced to re-roll in order to find entertainment or to learn a completely different game.'

Indeed, if anything, spending time with the game will help accustom players to Fury's crowning glory – the Incarnation system.

'Each Incarnation is a collection of skills, abilities and

Above Fury even includes a bit of fan service.

equipment that you, the player, construct via a points system. Each incarnation can be as focused or as diverse as you desire,' explains Carpenter.

You don't even have to lose an incarnation that you like – it can be saved and recalled like your favourite weapon loadouts ala DiCE's Battlefield.

'Fury's Incarnation system is unlike anything in an MMO to date. Unlike WoW's talent points or EQ's AA points, there's no cost associated with changing an incarnation. This gives players unprecedented ability to build new incarnations, test them out, and then tweak them as much as they want.'

BALANCING ACT

Currently the biggest affliction to plague the MMO industry, other than 'I'm a derivative!' syndrome, is class balance. No one likes to play an underpowered character, and Auran has not gone into Fury's production unprepared. Balancing issues are particularly a problem when expansion packs are released for a game – new content, be it revamped existing powers or new exciting ones, has a tendency to throw an established game ecosystem out of whack.

Fury's solution to this problem is simplicity itself: Forget about adding new abilities.

'Who says new abilities are required for a game to stay fresh? Why can't additional gameplay experiences come from things like game types, new levels and the addition of major systems such as crafting, territorial battles or guild enhancements?,' Carpenter says.

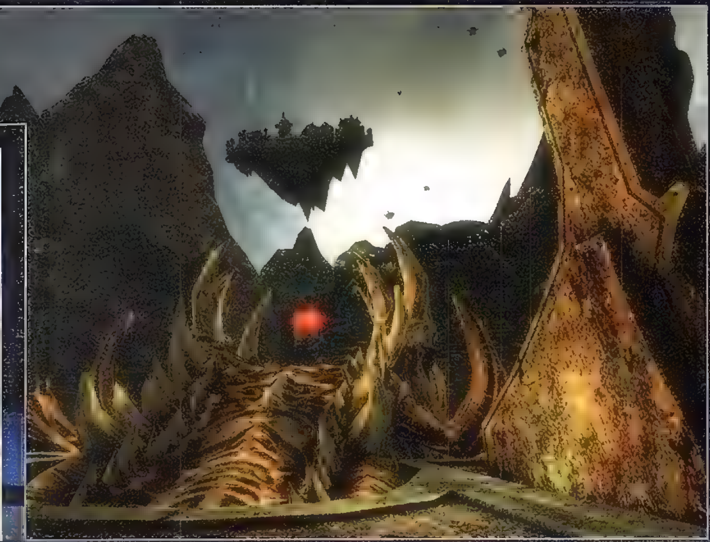
The developer agrees that if Fury depended on new abilities to invigorate the game, it would not only face the balancing act of keeping the new powers in check, but dealing with 'ability bloat' – the addition of content for the sake of including it.

'This is why we are looking to create new gameplay experiences [instead],' he says.

Despite what seems like the perfect plan, Auran will inevitably face balancing issues once the game hits the world at large. Carpenter however assures us that the team will be doing everything it can to minimise any hiccups.

'Our method for balancing ability combinations comes from two directions, the first being analytical and the second being empirical. On the analytical front, we use engineering calculation packages as well as simulation software to create baseline values for ability power. Using our tools, we then explore a diverse array of ability combinations and test for magnitudes outside our desired range. When we find those combinations, we make adjustments as necessary to bring them back in line with our desired targets,' he says.

'On the empirical front, we've formed a Fury "core group" of players who are all very hardcore, very experienced players. This core group has direct-to-developer feedback channels and through them we gain invaluable information about incarnation setups, abilities combinations and



Left Unleash the power of the colour purple!
Below Creepy and dark... just how we like it.

**Above Neo and Agent Smith? Not exactly.
Right Fury includes a large variety of character customisation options.**

The end result is that players will find that there are no 'flavour of the month' classes, as is found in other MMOs. Unless an incarnation is in-tune with a player's own style, they will find supposed 'overpowered' combinations less than amazing.

ENGINES OF FURY

Fury's technological foundations are provided by Epic's impressive Unreal Engine 3. So alluring is the engine that it has attracted the attention of a number of triple-A developers including BioWare, Irrational, Sega, NCSoft and even Final Fantasy creator Square Enix. Despite this pile-up of developers hankering for Epic's tech goodies, Auran is confident that it will differentiate itself from other UE3-based games with its distinctive art style.

An interesting decision by the company was to not use its own engine technology, called Jet. Jet comes with all the bells and whistles – AI, sound, networking and interface support. For creating games, it represents the complete package.

Unfortunately for Jet, visually it is a dinosaur. The renderer is designed for Microsoft's DirectX 8 – a 3D API that only touches on the power of programmable pixel and vertex shader pipelines. In this era of next-gen consoles and DirectX 10-compliant graphics cards, getting Jet up to scratch as well as developing a top-of-the-line MMO would have posed quite a challenge.

'Our primary focus has always been on the game and in order to upgrade Jet to deal with next-generation video cards we would have needed a substantial engineering team committed just to technology. We decided we'd rather have as many of us as possible working on the game itself rather than on the supporting technology,' explains Fury producer

WHERE FOR ART THOU EXCALIBUR?

Although it never saw release, Auran's Excalibur could be considered the spiritual predecessor to Fury. Comparing screenshots of both games, it is easy to see that they share a visual feel. Of course, when Excalibur was being developed, Unreal Engine 3 was not available, and Auran used its own Jet technology.

Sadly EA, the game's publisher, cancelled Excalibur, ending any hope of the game making it onto shelves. That didn't stop Auran from taking advantage of what work it had already done.

'Fury was inspired by Excalibur and our early prototypes and tests drew heavily on the Excalibur code base and assets. Our team also gained valuable experience through their work on Excalibur,' explains Carpenter. 'While we could have continued with Excalibur independently, we were keen to develop the online team combat aspect of the gameplay and this lead us to developing Fury instead.'

than on the supporting technology,' explains Fury producer Paul Whipp.

Regardless, the team was able to take something from Jet's development.

'Jet does live on in Fury. We support a much wider range of hardware than UE3 by virtue of our alternate rendering pipeline. This is a second rendering engine capable of displaying the game on older video cards – all the way down to Geforce4 Ti-based systems.'

With the two renderers available, Auran is confident the game's performance will scale well despite the power of the PC it is running on – players with beefy systems will simply get better visuals.

'The game will not look as good as it would on a next-generation video card, but it will look better than most games on [a] low-spec system and the player will be able to play the game at a good frame rate,' says Whipp.

Not all the work is done by UE3 or the components salvaged from Jet. Every massively multiplayer game relies on sophisticated server software to cope with the constant influx of player data, which needs to be processed and sent back to the client. This isn't even taking into account the huge database resources required to store player information and other vital statistics for use in other systems such as competition ladders.

Although a number of middleware MMO server products are available, many developers will create their own software to cater to the unique needs of their game. Such is the case with Blizzard, Sony, EA and others.

One such third-party product is BigWorld, developed by Melbourne-based outlet Micro Forté. If Auran was happy to license UE3 to handle the game itself, it would seem logical that it would try to do the same on the server-side as well.

'BigWorld is designed for a seamless persistent world. As such it is not suited to Fury's large player population and inter-realm combat. Of necessity, the server has been a significant part of our engineering effort, but thanks to the talents of our very experienced Swedish engineers we have a simple and effective server system which has already proven itself in alpha testing.'

According to Whipp, stress tests of the system have been very encouraging – even with the heavy action focus of Fury, a 300ms ping proved a trifle for the server, the lag compensation abilities of UE3 and Auran's own work on Fury's netcode.

END-GAME

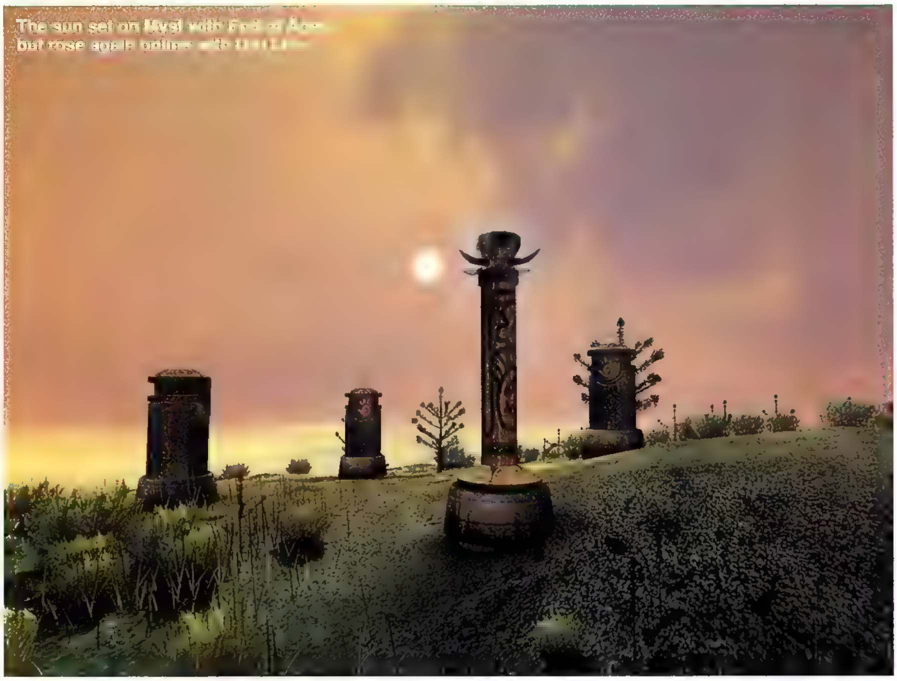
Fury's development team currently sits at sixty full-time staff, which Carpenter says makes it the largest project Auran has ever worked on. Already the team is preparing for the six months following the release of the game later this year, and the foundations are being placed for new content.

Right now Auran is putting the final touches on its first beta candidate for Fury – hopefully we'll see it in our hands in short order or at least, in the form of an online download or torrent. Rocket-propelled courier is also fine.

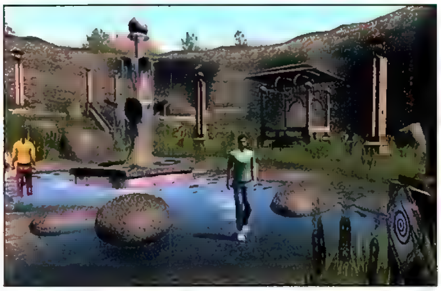
'A real advantage of our internal, alpha and soon to be beta testing is that it gives us a fairly significant amount of time to tune and revise the game,' says Carpenter. 'The overall goal is create an advancement timeline that provides meaningful rewards to players at all stages without forcing them to grind.'

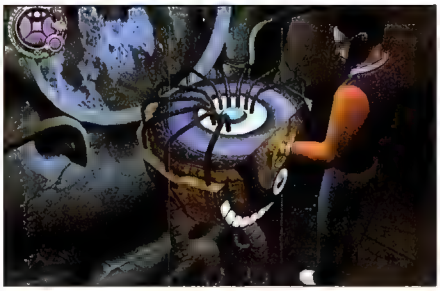
After three years of World of Warcraft all we can say is: Ahem to that.

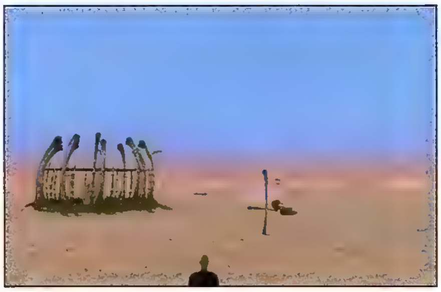
Above Nothing like a good stab to end the day. **Below** That's one hell of a shield.



The sun set on Myst with End of Ages but rose again online with Uru Live.







Myst Online: Uru Live

Remember when Myst was bigger than Sudoku? **David Kidd** takes a walk into the curious world of the D'ni.

Myst has a convoluted history. The original was one of the biggest selling games of all time, and was followed up by the excellent Riven. Then, the series took a slow dive, producing incrementally poorer sequels before ending with Myst: End of Ages.

Prior to Myst 5, however, the series was spun into a third-person, modern day adventure – Uru: Ages Beyond Myst. This spawned an online version, Uru Live, which was canned shortly after it launched. Fortunately, developer Cyan Worlds scored a deal with the GameTap subscription service, and for US$12.95 a month you can play through all the Uru Ages, access new episodic content, and go puzzle solving with others.

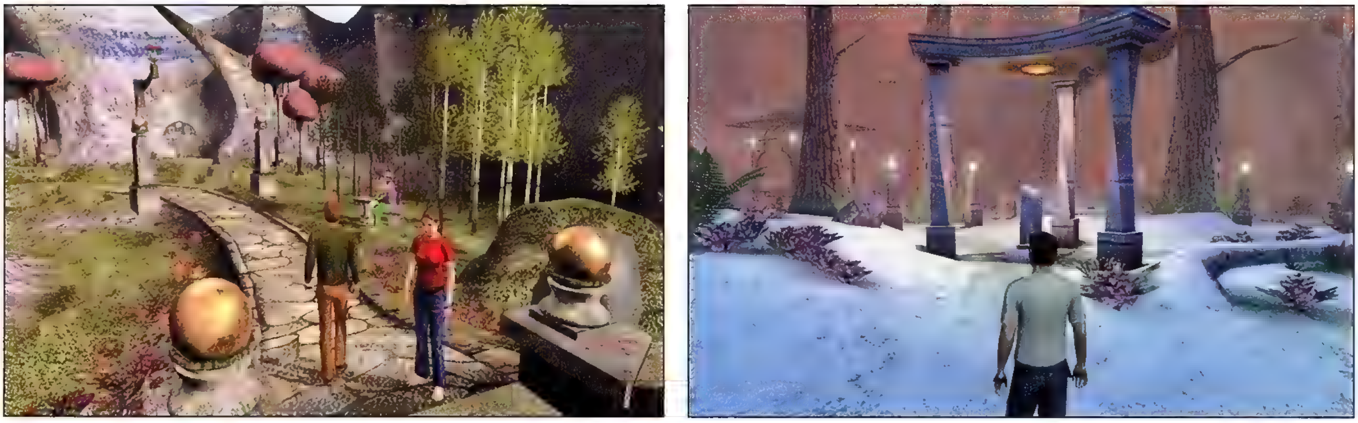
So what exactly is Myst Online? What follows is the closest approximation of an explanation we can muster.

The best place to start is the Age of Relto. In Myst-speak, an Age is just a place – it exists at some point or points in time, and can only be accessed using a linking book. The Relto Age is a tiny island floating in, well, mist, and it serves as your personal home base. Here, you'll store the linking books to other Ages, change your clothes, and 'upgrade' your island by finding symbols through your travels.

Contrasting with the incorporeal protagonist of the original Myst, you now have a name, face and 3D body. Your avatar can be controlled in first person or third person 'over the shoulder' modes, and both will be important when moving through the Ages.

From Relto, you can take one of two broad paths. Firstly, you can go on the 'Journey', which is a largely solo affair – though you can group with others – and learn more about what's been going on with the D'ni people and their disappearance. In further contrast to the original, Myst Online is set in the modern world and the first Age you'll adventure through is the Cleft – a small chasm in modern day New Mexico. From there, you'll get booted into the story, and further Ages will open up for you to solve.

The Ages look absolutely stunning, each bringing a whole new design, story and obscure set of puzzles. Unfortunately, the interface and utterly woeful physics modelling means the many action-oriented puzzles are a constant source of agonising frustration. Still, the combination of third person, first person and point-and-click modes makes it easier to cope.



▲ **Uru Live is a great place to meet someone to go and solve an Age with… or go it alone if you must.**

Being a worker for the D'ni Restoration Council is a little more mentally taxing than coffee breaks and slowing traffic.

If you like, you can forgo the Journey and dive straight into the larger multiplayer mystery. You see, you're not just some schmo on an island, teleporting into strange worlds, pulling levers and watching waterfalls – you're an explorer with the D'ni Restoration Council (DRC). This is a group of researchers who, having stumbled on this vast underground city under New Mexico, began opening up sections for others to explore. The official DRC members (or game masters) often interact with players, drop hints, and even change parts of the city.

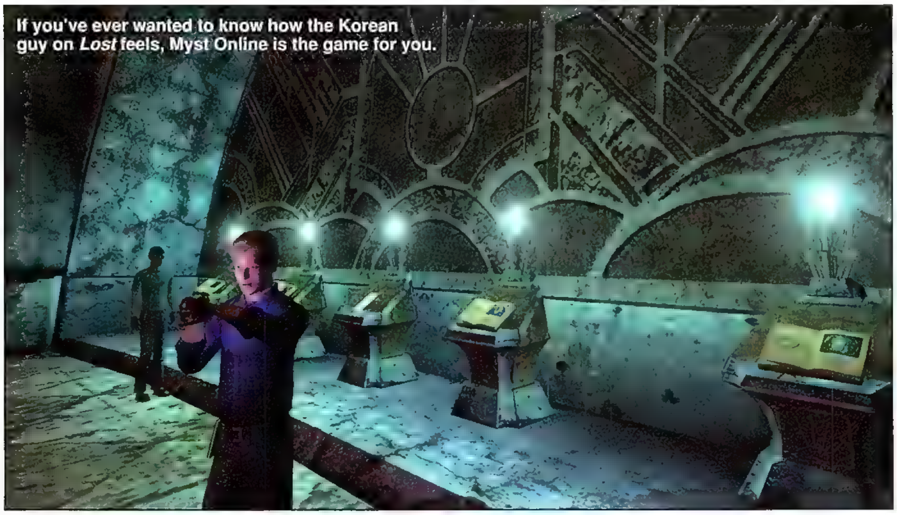
This city area is the second main part of Myst Online. Instead of following the Journey, you can link to one of the many public and private 'neighbourhoods' – each being a small, instanced meeting place. There's one common instance of the cavern, which is where the main plot events take place. An event could be as minor as a door opening slightly ajar so you can peek inside, or it could be the opening of a whole new Age for you to explore. For hardcore Myst players, these drip-fed story elements are like crack.

Ultimately, it's all a bit messy. From the first time you see your avatar standing in Relto, you simply have no idea what's going on. You start touching things, warping to Ages, reading arcane books and listening to mysterious holograms talking gibberish. When you figure out how to meet others, it's even worse – now you have people all around you speaking this same gibberish. Deciphering how to make a strange machine work on an island is one thing, but picking up the hundreds of plot threads that fly around the chat window is a nightmare.

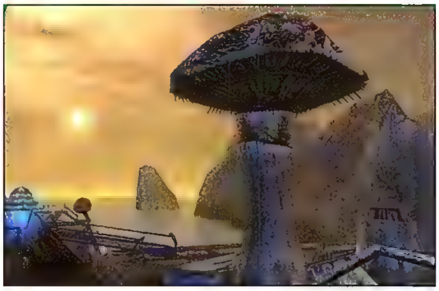
Every day, there's more information being fed by the developers, leading to yet more speculation from the community – it's like being the Korean guy in *Lost*. But just like the Korean guy, you do get a bit better at figuring things out the more you play. You get a bit more interested in the plot, you start asking people questions, and you eventually find someone to go and solve an Age with.

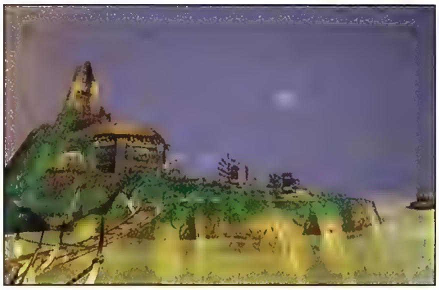
But what happens when you've moved through all the Ages? Each Age may take a day at most to solve, which means you'll be done within a month of casual playing. For US residents, Myst Online comes free with a GameTap subscription, making it much easier to swallow. But for Australians, it's the full US$12.95 per month just for Myst Online.

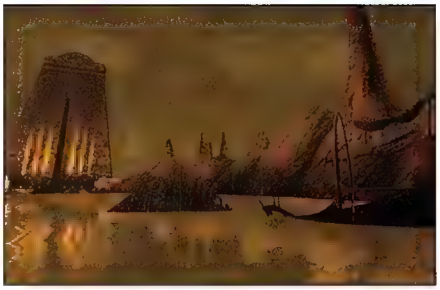
Is it worth US$12.95 a month? If you like the Myst mythos and you see yourself engaging with the main story, possibly. For everyone else, the worst you can do is fire it up for a month and see for yourself.

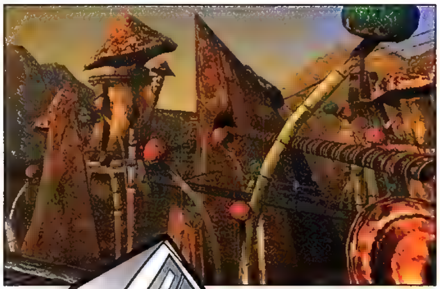


If you've ever wanted to know how the Korean guy on *Lost* feels, Myst Online is the game for you.









PC

Developer **Cyan Worlds**
Publisher **GameTap**
Website **www.mystonline.com**

Recommended
2GHz CPU, 1GB RAM, 4GB HDD, DirectX 9.0c graphics.

VERDICT

✓ **Beautiful, Myst-like puzzles; ongoing story; new take on MMOs.**

✗ **Terrible physics; awful interface; high entry level.**

SCORE **7.0** OUT OF **10**

Spider-Man 3 has more crotch shots than a Steven Segal movie.

Spider-Man 3

Logan Booker wanted Emo Parker as an unlockable.

Going next-gen for the sake of next-gen will be one of the more popular trends for gaming this year, judging by Treyarch's gurgitation here of Spider-Man 3. It's not a bad game, per se, but then it's not a good game either. If we had a leaning, it'd be towards the bad – just the thought of picking up the controller again to guide Spider-Man through the streets of Manhattan is about as alluring as administering a laxative to a cow – the *uncool* way.

While we got our hands messy with the Xbox 360 version, adventurous gamers will have no trouble finding the title on almost every other platform in existence, including the high-tech handhelds. It's likely the game's downfall is a result of this strategy of platform androgyny, the logic being for Activision that if you squeeze off a round from a shotgun, you'd have to get a hit somewhere. For its sake, I hope this is the case, as we can safely say the 360 release missed whatever its target was by a good kilometre.

Treyarch has not changed a great deal from the previous Spider-Man. There's a different plot, to be sure, involving bits and pieces from the new movie as well as few fresh tangents that include the likes of the Lizard, Scorpion, Calypso and Rhino and, depending on which platform you have the horror of playing SM3 on, Electro, Morbius and Kraven. And yes, the combat system takes advantage of Spidey's cooler abilities, including better and more useful web attacks and a bullet-time mode that kicks in briefly when you dodge blows, but gets annoyingly fast.

Oh, there are even Resident Evil 4-like cinematic scenes that require you to hammer buttons in a particular order to jump, dive and swing your way through various scripted sequences, that wouldn't be so bad if they weren't so damn hard, and didn't require you to sit through short bits of exposition from Peter Parker that cannot be skipped each time you fail.

The flow of the game itself relies on navigating through a giant digital recreation of Manhattan.

Actually getting from place to place is made simple thanks to the map that provides highly visual guides to each 'story' point. Like many open city games in the vein of GTA or more recently, Crackdown, touching a story point

▲ **To the left, Spider-Man subdues a thug with his bloom shooter. Oh, and he has his web shooters too.**

We'd very much like to write an informative caption here, but we have no idea what the hell Spider-Man is doing in this shot. Riverdance, maybe?

activates a mini-game, the most depressing of which has you giving Mary-Jane a ride to whatever location she needs to go to while acquiescing to her demands to swing high or low. Your reward: Love hearts.

Yes, it's lame enough to make you vomit and cry at the same time. We don't know about you, but this is not the experience we were expecting. It'd have been fine in The Sims… but a superhero game? Really, what were you thinking Treyarch?

Another sore spot for SM3 is its sub-par graphics, which look like they were artfully drawn for the lowest common denominator. By adding some HDR effects – read: Retina-frying bloom – the developer has tried to hide their hideous nature but to little effect. It probably looks great on the PS2… for the two people who will play it.

Perhaps the only things to hang around for are the voice-overs. Well, voice-over. Kirsten Dunst appears to have been stricken with a case of common sense and doesn't make an appearance, but close to everyone else is there, including Topher Grace, Bruce Campbell and old Tobey 'Big Blue Eyes' Maguire. Mind you, if not for contractual obligation, it is unlikely any of the cast would have turned up at the sound studio at all. Campbell at least has a bit of fun with a couple of smirk-worthy lines, but nothing you couldn't get from a screening of *Evil Dead*.

All up it's a disappointing effort, a game that didn't need to be made when you consider the availability of Ultimate Spider-Man, which is actually good.

Start praying they don't make a fourth Spider-Man flick.

Bigger than Ben Hur, just a little bit tired.

Developer **Treyarch**
Publisher **Activision**
Website **www.sm3thegame.com**

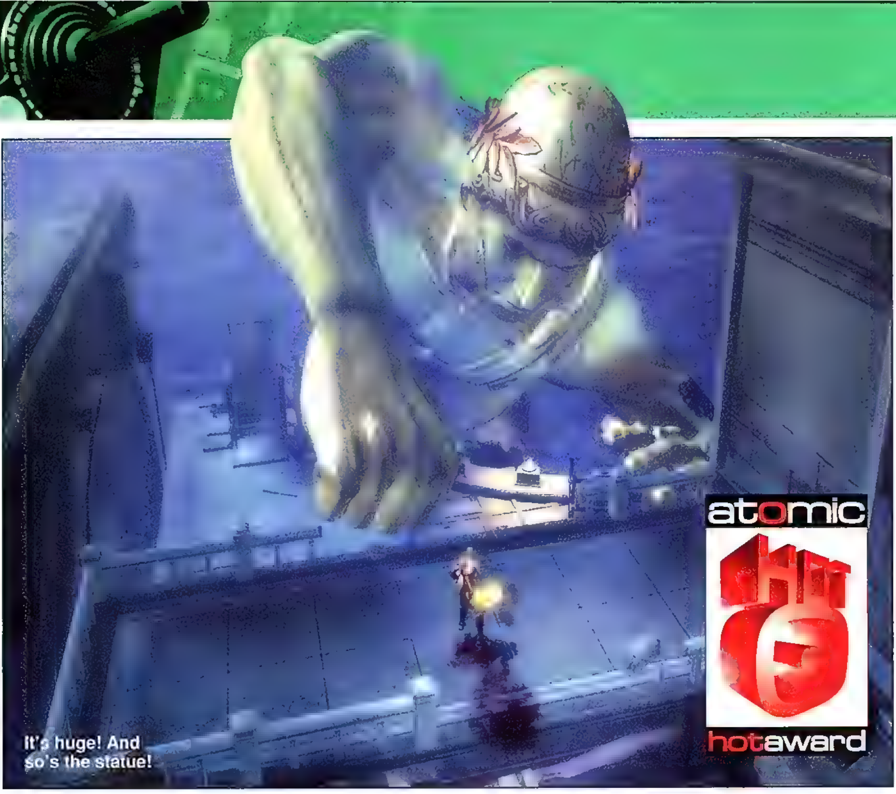
Players **1**
Other platforms **PS3, PS2, Wii, PC, Gameboy Advance, Nintendo DS, PSP**

VERDICT

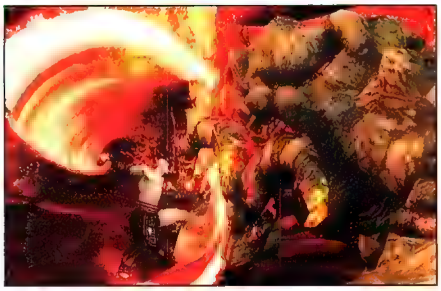
✓ Big city to explore; solid mission structure; Bruce Campbell.

✗ Average graphics; repackaged SM2; tired voice acting; annoying new combat system; cinematic bits you can't skip.

SCORE 6.0 OUT OF 10



It's huge! And so's the statue!



God of War 2

David Field thinks two war gods are better than one.

As a general rule, games should try and push boundaries and be larger than life. You can apply this to most genres and then gauge how the game makes you feel as you play it. We love games like God of War, because they leave us with an Earth-shattering sense of enormity. In this regard, God of War 2 fits in quite nicely with its predecessor.

You play Kratos – a demigod stuck between the wills of warring Greek gods. Chief among them is Zeus (who's upset that you have the free will to defy him) and Gaia, who is sick of Zeus being a dick. As you avoid the proverbial plates being hurled from Zeus' kitchen into Sparta, you go on your own quest for revenge and destruction. We're not going to ruin it, but we will say the story is brilliant.

THE WAR IS TOO VIOLENT

In the lead up to its release, God of War 2 had a run-in with the Office of Film and Literature Classification (OFLC). It wasn't in regards to being able to tear heads off bodies or the rest of the gleefully senseless violence, it had to do with a mini-game in which protagonist Kratos and some women in a bathhouse were able to share the love, so to speak.

Like the love Kratos showed for the ladies in question, the controversy was short-lived. God of War 2's retail release in Oz still contains the scene that sparked the controversy, and the game carries the MA 15+ rating – the most stringent restriction that a video game can be assigned before being effectively banned from sale with an RC (or Refused Classification) rating.

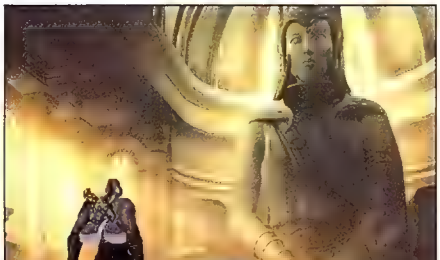
The gameplay itself is a combination of Ninja Gaiden and Prince of Persia, with a few mini-games thrown in for good measure. You'll be stringing together long, uh, strings of attacks into bloody and slash-tastic combos that will get bigger and better with time as you unlock more weapons and improve them with XP for more potent attacks. They are a brutal compliment to Kratos' finishing moves – which typically involve dismemberment.

The mini-games break up the battles, and range from something as simple as hitting buttons in a sequence to flying Pegasus-mounted battles. None feel tacked on to the game for the sake of it, and they all highlight the action by keeping the game from becoming repetitive.

At times, and even on the lower settings, the difficulty could be considered madness. But

We should probably find it odd that killing things never gets boring.

God of War 2 is a game that's easy to get hooked on.



this is Sparta! Nothing is done by halves, which is evident from the epic opening battle against the Colossus of Rhodes (you're roughly the size of his *finger*) during which you jump into a ballista for a more direct attack. Rarely does the pace and scale ever let up (with the exception of the occasional puzzle) and it all adds up to something very special.

This will probably be the last hurrah for the PlayStation 2. Everything here is first rate. On their own, the effortless gameplay, riveting storyline, beautiful artwork and action on a truly awe-inspiring scale all make the game great. The soundtrack fits the game perfectly; the voice acting is top notch and the controls are beautifully laid out and make for fluid combat. The visuals look like they came from a secret generation of hardware developed somewhere between the PlayStation 2 and 3. There is even a distinct lack of loading screens, which allows you to revel in the stunning imagery generated by the PS2.

More important than all this, however, is the flawless way in which all these elements are combined that make God of War 2 outstanding. If you ever hit a moment when one part of the game isn't putting a huge smile on your face, every other part of the game will keep you easily entertained.

Your PS2 will hate you if you don't play it.

World's lamest caption: Get a grip, pal!

PS2

Developer **Sony**
Publisher **SCE Studios Santa Monica**
Website **us.playstation.com/GodofWar2**
Players **1** Other platforms **None**

VERDICT

✓ Mini-games; finishing moves; combos; no loading screens.

✗ Released too late to show the makers of *300* how it's done.

SCORE **9.5** OUT OF 10

[illegible] versus... Pretty Pink Attackbot?

War Tech: Senko no Ronde

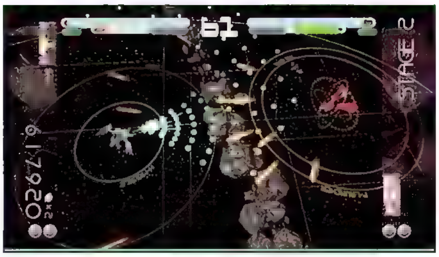
Hey, it's better than Shatner's TekWar, says **Logan Booker.**

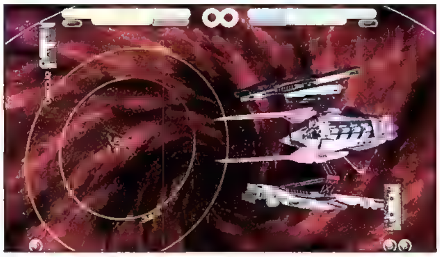
War Tech: Senko no Ronde is about as Japanese as a game can get without writhing, sex-crazed tentacles. Known as simply 'Senko no Ronde' in its homeland, War Tech combines adolescent girls, giant robots and an insane story involving a world-destroying wailing child and transforms it into something that resembles a game. Having enjoyed a great deal of popularity at the arcades in its native country, developer G.rev and publisher Ubisoft have teamed up to deliver a version palatable to Western audiences.

And it almost works.

The game proper brings together elements of traditional 2D beat-em-ups such as Street Fighter II and melds them with the gameplay of a scrolling shooter, in the vein of Raiden and R-Type. Players take the form of combat mechs, or Rounders, and are thrown into a series of constantly revolving arenas outside space stations, in orbit of planets and above massive futuristic cities.

Except, unlike Virtual On, you'll never feel in complete control. Playing for the first time, command of the Rounder will seem unresponsive, sluggish and even a bit automated. And that's because it is. The game makes sure that each combatant always faces his or her other, aiming coming down to a reflexive flick of the left analog stick. Each Rounder has a primary weapon, fired via 'X', a more powerful secondary attack activated using 'Y' and a barrage attack that fires everywhere when you hit 'B'. 'A' serves as a dash maneuver, but due to the incredibly imprecise nature of the controls, you have just as much chance of dodging incoming fire as you do running directly into it. The left paddle is a more effective means of protection, as it activates an expanding ring of force that destroys all types of munitions and repels your opponent if they're too close.



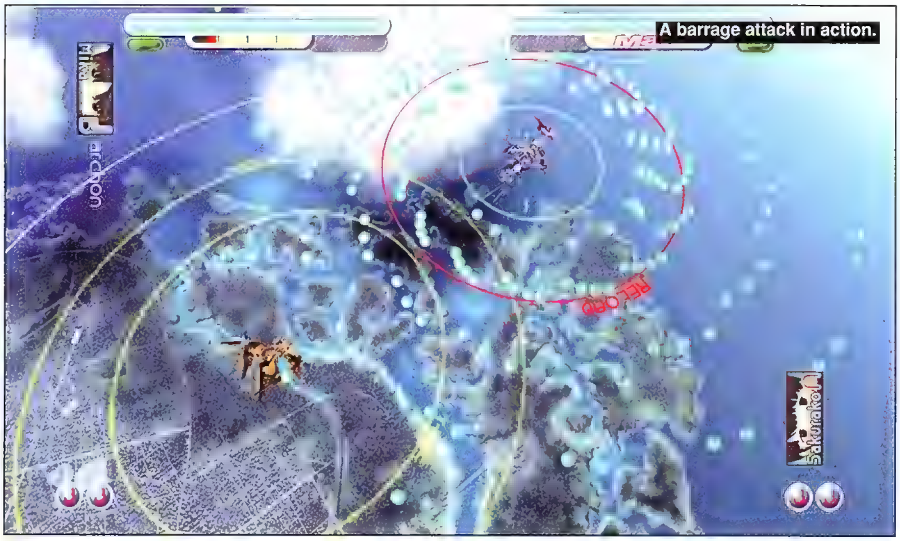


Of course, all these abilities have varying reload times, which are tracked by a pair of thin 'refilling' concentric circles anchored to your character.

Two power bars float at the top of the screen – the largest one relates your current health while the other keeps record of your 'charge' energy. This energy is drained by firing weapons or using your force field via the right trigger. Not doing anything (other than moving) will allow your energy to regenerate. Causing your opponent harm will also add a few drops to the charge bar.

Mixing this up is the B.O.S.S. (Booster Over-armed Shell System) mode, arguably War Tech's defining feature. A tap of the left trigger will summon a shell for your Rounder to dock with that's packed with an unmentionable array of punishing armaments. For all intents, it briefly transforms the game for your opponent into the final boss fight of a typical scrolling shooter. To prevent abuse, players are limited to two uses per match.

Intelligent deployment of this mode can be devastatingly decisive, as you not only gain weapons that can fill the entire screen with lasers, missiles and bullets, but your health


A barrage attack in action.

regenerates as well. The shell remains active until all your energy is expended, at which point it disappears and the game returns to normal.

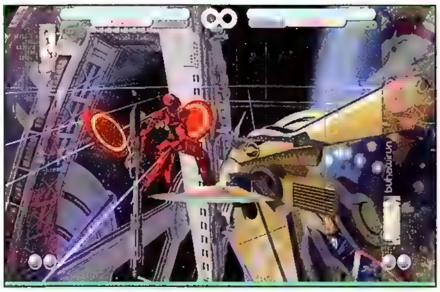
While we'd like to say that there's a load of strategy involved in B.O.S.S. mode, mashing all the buttons on the controller has so far proven to be the most potent tactic.

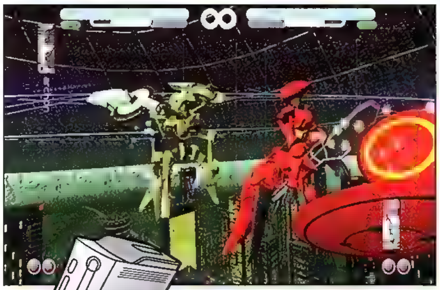
There are story, versus, training and Xbox Live modes, and an extras menu for unlockable concept art and Rounders. The story mode doesn't function in the typical way, as each character presents only out-of-sequence snippets of the complete tale. In order to understand the plot at all, you'll need to finish story mode with every character, which will try the patience of those who don't click to War Tech's bizarre brand of gameplay.

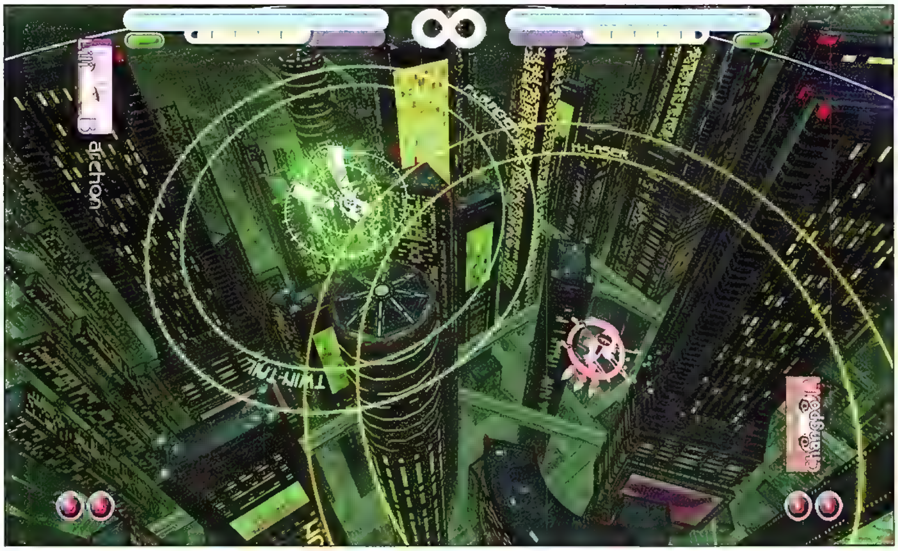
The training mode is deceptively named, as it teaches you nothing of the game's basic controls. The story mode also launches directly into battle with no tutorial, ever, and coming to grips with the mechanics is pure trial and error.

Lurking beneath the nigh-impenetrable surface of War Tech is an addictive game that fuses genres better than an oxyacetylene torch. Yet, even then, that game has far too many problems to be truly great. Excellent fodder for the arcades, but as a $100 Xbox 360 game, it's excessively dear for what it offers.

> “Others have described War Tech as ‘Virtual On in 2D’, and we have to agree...”







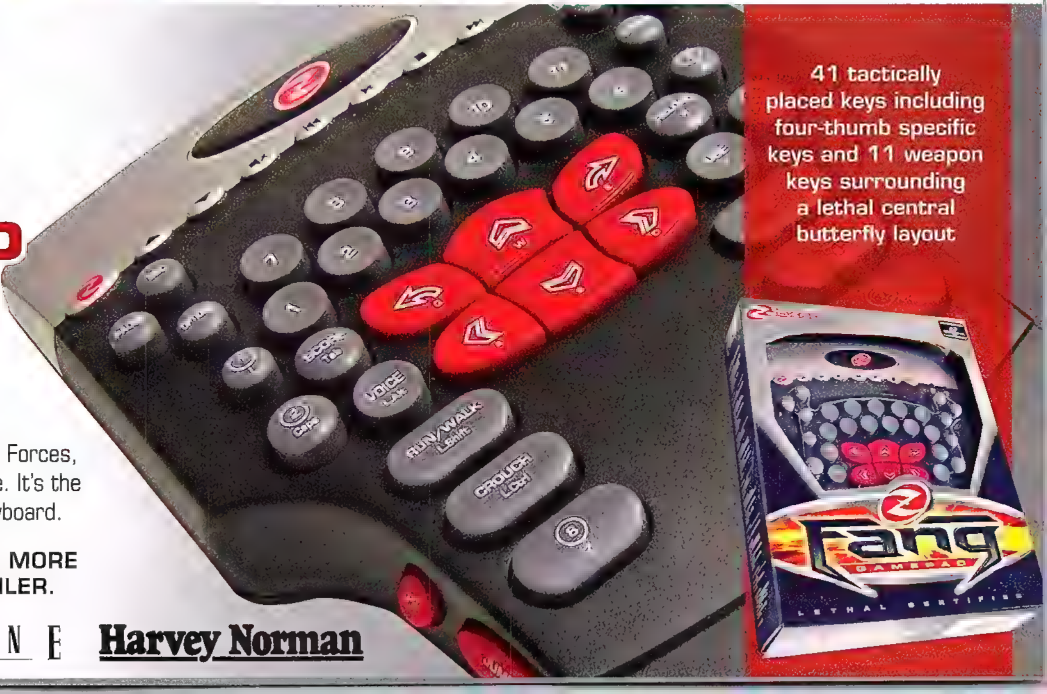
Developer G.rev
Publisher Ubisoft
Website www.ubi.com/au
Players 1-2, Xbox Live
Other platforms None

VERDICT

✓ Plenty of characters, each with a different strategy; funky visuals; intriguing story.

✗ Imprecise controls; niche appeal won't satisfy most gamers; steep learning curve.

SCORE 6.5 OUT OF 10



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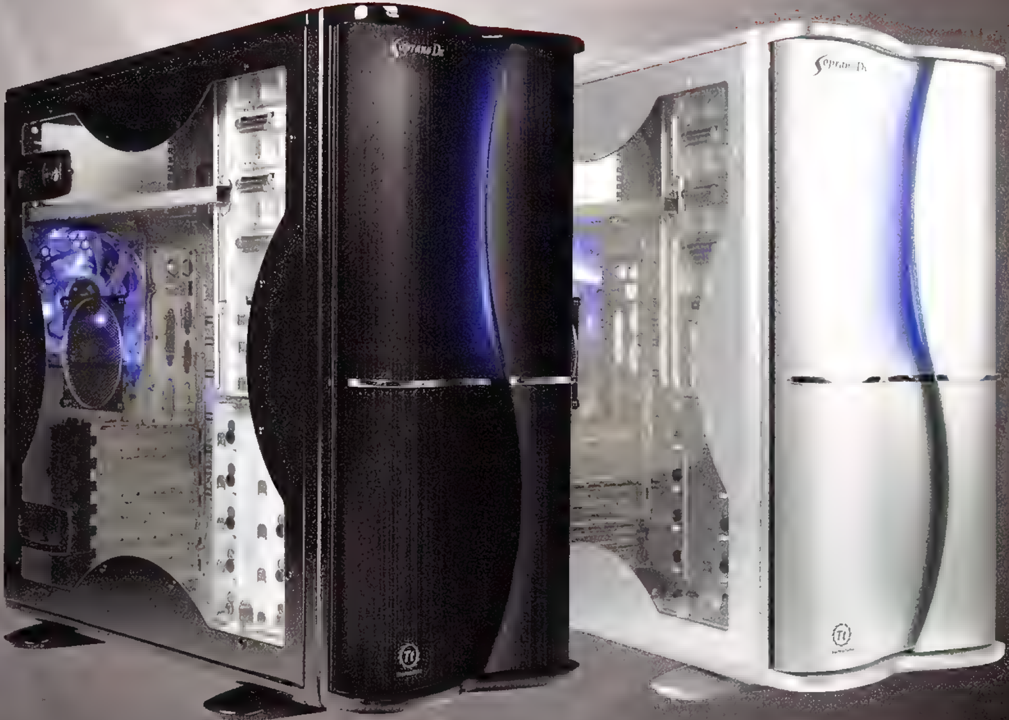

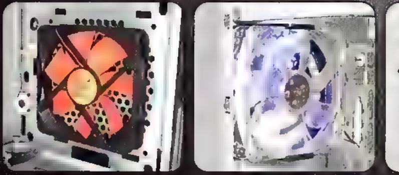

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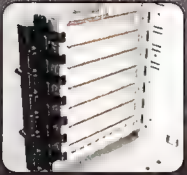

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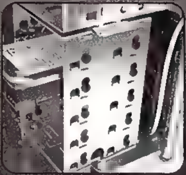

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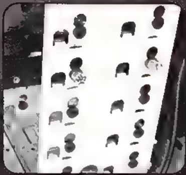

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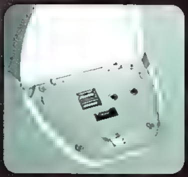

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28 Weeks Later

CINEMA Distributor: 20th Century Fox Web: www.foxatomic.com
Director: Juan Carlos Fresnadillo Starring: Robert Carlyle, Harold Perrineau, Rose Byrne

Oh dear merciful God – not only does *28 Weeks Later* completely miss the point of the first film, drive over its subtleties and make a mess of the overt, it ham-fistedly deals with its own political agenda. Want to make a commentary on the Iraq War? Not the place to do it guys.

Admittedly, *28 Days Later* was not a perfect film – but it was very, very good and we'd dare say one of the best zombie flicks ever made, even though it's technically not one; director Danny Boyle's zombies are actually still alive.

28 Days followed 'Jim' (Cillian Murphy), a bicycle courier who wakes up in a UK hospital 28 days after falling into a coma, brought about by a car accident. Jim finds the hospital deserted and soon discovers that a virus has spread throughout the country, causing those it infects to fall into a frenzied, violent rage.

The movie dealt with fear, isolation, family, friendships and loss – elements usually skipped over in proper zombie features, while still maintaining the scares. Add in a killer soundtrack, one of the best opening scenes ever and top-notch camera work and you had an instant classic.

Unfortunately *28 Weeks* takes this precious gem of cinema and deposits a giant, steaming crap on it, forever tainting Boyle's work.

It starts well: We find ourselves inside a cottage in the English countryside, where couple Don (Robert Carlyle) and Alice (Catherine McCormack) have taken refuge from the now-insane population – along with an old married pair and a few randoms. Suddenly, there's a panicked banging at the front door and, risking their own lives, the bunch takes in a young child being chased by the infected. It doesn't take long for the silent haven to be attacked by the enraged mobs and after a frantic tussle where Don has to make a terrible decision, he finds himself the only survivor of the invasion. As he escapes, we hear the familiar heavy metal tune the first film is famous for, and we feel confident that *28 Weeks* might just top the work of its predecessor.

Alas the flick takes little time to gut us of these lofty expectations. We travel six months into the future, and a US NATO force is overseeing the repatriation of the British Isles, starting with a small spot of land in the middle of London. Never mind that outside this area, the city is teeming with dead bodies, dogs, rats and quite possibly infected, they're bringing civilians into what had only half a year ago been a country ravaged by a highly contagious virus. Even Rose Byrne's character of Scarlet, an Army doctor stationed in the 'cleared' zone, mentions at the start that they still don't know much about the virus. In fact, the only reason you'd even think of re-populating would be to set up a horror film. Sigh.

Things don't get any better, despite persistent prayers for divine intervention. Improbable meets impossible, which in short order gets beaten to death by stupidity and by the end of the film you'll be beyond caring who lives and dies – except maybe Byrne who looks pretty darn smoking in her combat fatigues.

As fans of zombie flicks, and of *28 Days*, we were desperately hoping *28 Weeks* would be good. It wasn't. From the ridiculous plot and overused gore, to the shoddy camera work, the film is nothing more than average. **LB**

score **5.0** OUT OF **10**

Nerds FC

DVD Distributor Madman
Starring Andy Harper, Milan Blagojevic

We didn't watch *Nerds FC* when it was on television. It just didn't seem like our kind of show. But you know what, now that we've seen it, we have to admit it's pretty good. The premise seems to be standard reality show fodder – former footballers Andy Harper and Milan Blagojevic have three months to turn 14 self-confessed nerds, devoid of athletic ability, into a proper team. But there's a lot more to it than that. *Nerds FC* is uncompromisingly honest about the hardcore geek lifestyle. It's funny too, but never condescending or humiliating – the polar opposite of *The Biggest Loser*. Everything about this series just screams SBS, right down to the way it's about football, as in the world game, rather than AFL or league. If football, with its on-field theatrics, low scores and relative lack of bone-crunching tackles, bores you senseless, you won't enjoy *Nerds FC*. For those who appreciate the game though, the transition of the participants from awkward but eager intelligentsia to reasonably competent sportsmen should prove compelling. The fact that the season is made up of just eight, 25-minute episodes is a plus – any longer and it probably would've become tedious. This isn't brilliant television by any definition, but it is entertaining. The second season is supposed to start on 9 June, and we're definitely going to be among those tuning in. **CT**

score 7.0 OUT OF 10

Shogun Assassin

DVD Distributor Madman Director Robert Houston
Starring Tomisaburo Wakayama, Kayo Matsuo

***Shogun Assassin* has all the makings of a classic – a kid with a bizarre** haircut who can calm evil ninja chicks by stroking their nipples, swords, weird hats and a funky synthesiser soundtrack. But in reality it's just… bad.

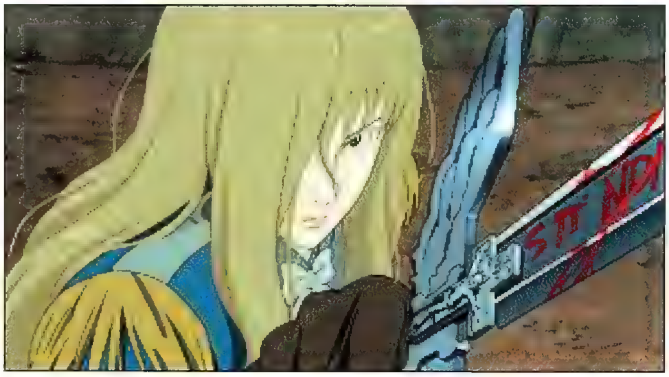
Most of the flaws stem from the fact that it's an amalgamation of the first two *Lone Wolf and Cub* films. A 'Best of' designed for an American audience. The editing is atrocious and the narrative is incoherent and illogical. Even with the voice over, *Shogun Assassin* is a real mess. The story – a simple revenge setup with a father and son who, mildly peeved at the shogun who butchered their wife and mother, wander the countryside killing people they don't like – doesn't even have a proper conclusion. *Shogun Assassin* was, of course, one of the main inspirations for *Kill Bill*. It shows. Many of the shots, scenes and sets are reminiscent of Tarantino's blood-soaked pair of films. It's just as violent. Indeed, it's an extravaganza of all that is bloody, gory and gross. Villains are sliced and diced, beheaded and impaled. The whole thing is unashamedly gratuitous.

In some circles, *Shogun Assassin* is rated very highly. We wish we could praise it, but it didn't really grab us. It has its moments, but ultimately the way this was cobbled together from two older, superior films, and then dubbed, is offensive. We suggest you check out the *Lone Wolf* series instead. **CT**

score 4.5 OUT OF 10

ANIME OF THE MONTH

Your regular dose of anime goodness courtesy of our resident expert Ammna Soemino



Le Chevalier d'Eon

Studio **Production I.G. Shochiku** Distributor **Madman** Web **www.madman.com.au**

With history, drama, and political intrigue, *Le Chevalier d'Eon* brings something new to anime. It manages to combine sword fighting, zombies, conspiracies and alchemy, all set on the eve of the French Revolution.

Based on Tow Ubukata's historical fantasy novel, *Le Chevalier* centres on D'Eon de Beaumont, a character with conflicting motivations – revenging his sister's death and his loyalty to France. In fact, the anime is loosely based on actual people and the historical D'Eon was a noted cross-dresser. The anime twists this into an interesting plot device, turning D'Eon's androgyny into the corporeal possession of the protagonist by the spirit of his departed sister. Ingenious. The result could have been a cheesy tale of swords, sorcery, clichéd characters and convoluted storylines. However, the conviction and depth of the characters and the beauty of the CGI backdrops of Paris and Versailles saves it and allows you to overlook the sub-par animation.

Chevalier is compelling if you have any interest in fantasy with a dash of politics.

score 7.5 OUT OF 10

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GEEKETTE A girl's eye view of the gaming world.

Nerf first, ask questions later

Kate Inabinet tries to deal with her magic missiles – now with less missile.

Once upon a time, the word 'Nerf' was associated with foam whacking bats and plastic missile launchers that shoot an assortment of soft projectiles. Precision-engineered toys designed to prevent the wee kiddies from getting brained too badly while they pillage. Unless of course you are an MMO gamer, in which case the mere mention of the word will have you falling to the floor in a rage-induced conniption fit. Rancid, expletive-driven spittle flying in all directions as you work yourself up into a writhing crescendo of twitching limbs and gurgling nonsense, until your eyes fill with blood and explode.

A 'Nerf' is when game developers introduce changes to a game, usually via a patch, that are intended to balance it. Most of the time this involves decreasing the effectiveness of a class, skill or item, or in some cases making it harder to farm for loot and gold – gamebots everywhere collectively sigh with disappointment. This often heralds seemingly catastrophic results for the players immediately affected, as their gameplay strategies need to be revisited and once favourite characters become chores of re-learning.

> “Entire gameplay strategies need to be revisited and characters become chores of re-learning.”

The most common reaction to a nerf, aside from a blown brain gasket, is to threaten to leave the game, and many actually follow through.

One classic example was the considerable nerf of 'epic' tailoring recipes in World of Warcraft. Note that these recipes take months and close to 1000 gold, the in-game currency, to use. There was such a massive uproar on the WoW forums, with a large number of users threatening to cancel their subscriptions, that Blizzard revoked the nerf and instead buffed, or increased the strength of, all high-level dungeon drops throughout the game.

So, while a lot of players are off finding out the hard way that, given time, pretty much all MMOs will actually practise the nerf, everyone else stays behind and moans about it. Local chat – usually reserved for the chronically dyslexic and Chuck Norris fans – instead becomes a thrumming hive of 'This game suxxor now and I am leaving' conjectures, punctuated with more 'Lern2Plays' and 'Cry More, n00bs' than you can poke a unique wand at.

Forums also get a thorough hiding, as players give their vitriol some virtual air time and discover a willing audience for their inflammatory complaints – although most threads on the subject of nerfs seem to fall into three distinct categories:

The first category is populated by the prolific 'Argh… this nerf totally shagged my whole game experience, and now I am going to have to go out and find a different MMO that won't render my 4000 game-hours spent obtaining XP, armour and skill acquisition totally for nothing.'

The second is full of the less common, but equally vocal 'Well, it didn't affect me, so quit your dang whining and free up the forum space for more of my "I pwn at everything" posts.'

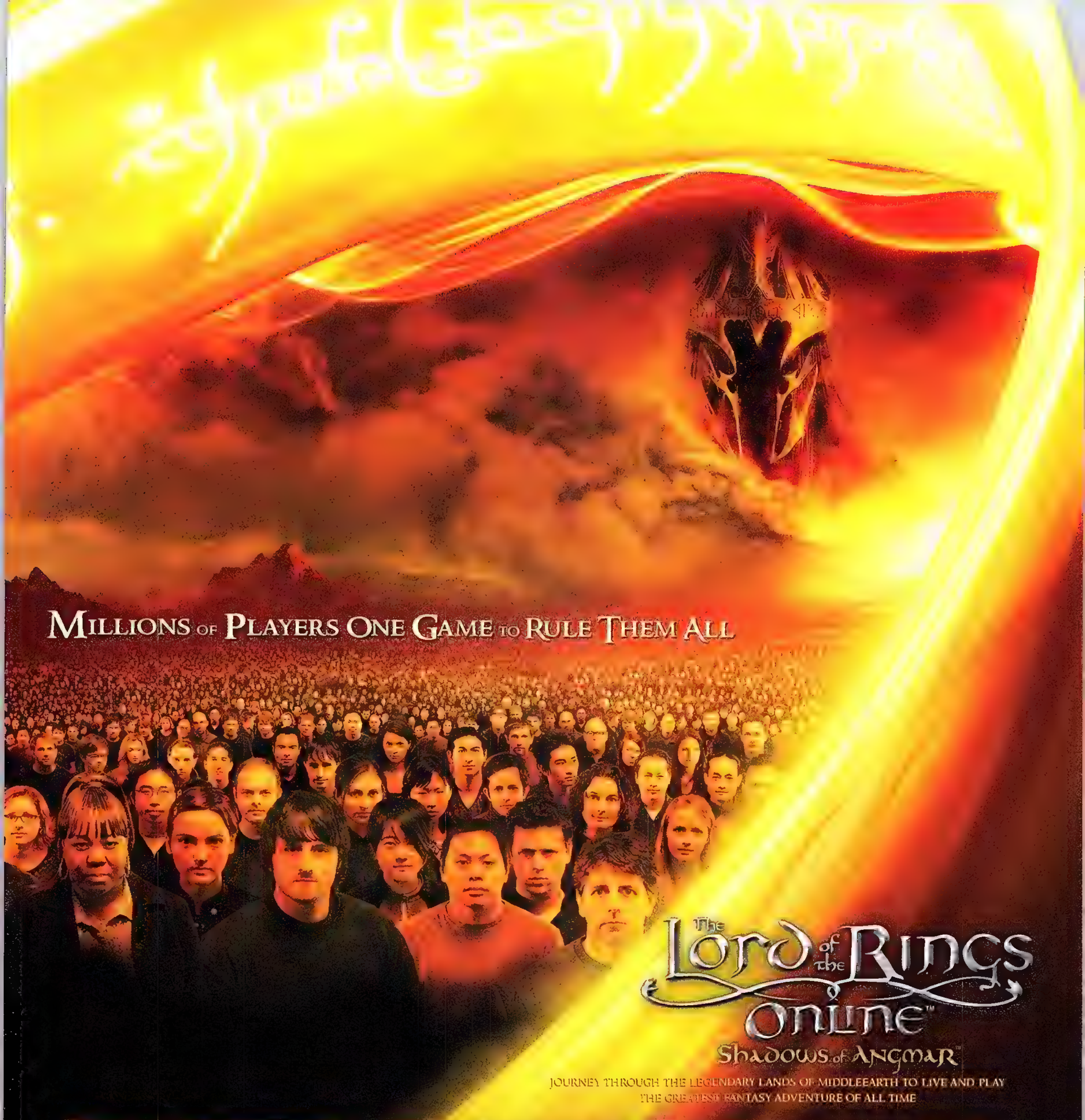
And the third, rare but worth the wait just for the glimpse, post being the almighty 'In response to your thread on the fact that we just nerfed your arse, we would like to make it clear that although we are more than happy to bask in the warm and fuzzy glow that is affirmative endorsement of the positive aspects of our decision, we are just as happy to skirt, or sometimes even flagrantly ignore, the more negative aspects of our latest upgrade. Don't make us write you one of our angry notes. Thank you and goodbye.'

Although every time a nerf takes effect, everyone bandies about the criticism like so many mud pies at a pre-school playlunch, most people understand that the changes are essential for the overall fairness of the game, and learn to adapt. It's just a shame that one class is often the target of a nerf, rather than all other classes buffed to compensate.

On that note I leave you with this beautiful quote from World of Warcraft:

'Our nerfs will block out the sun!'
'Then we will QQ in the shade.'

Are you one of the whiners that she's talking about? Send your inflammatory complaints to Kate.
geekette@atomicmpc.com.au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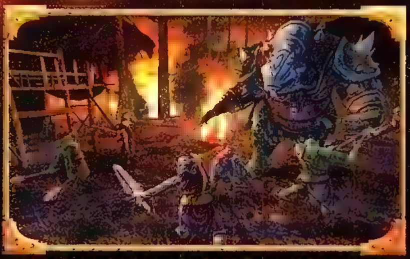

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THE ULTIMATE FOOTBALL MAGAZINE

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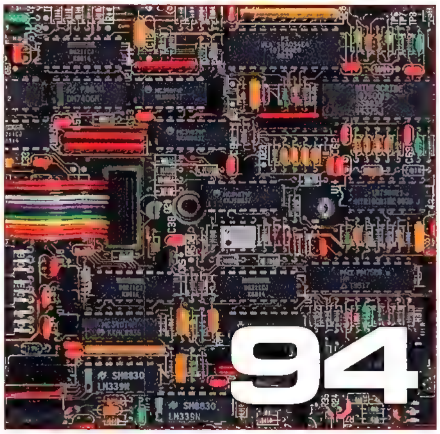
TECHNIQUE

HANDS-ON TUTORIALS FOR THE TECHNICALLY INCLINED

Discovery is cool. As is learning things. After all, if we stop learning what's the point of going on? Expanding skillsets is the forte of the enthusiast crowd, and to that end we have our regular tutorial pages to bury your noggin in and absorb yourself some new abilities.

This month our resident Linux geek Leigh Dyer gets his creativity on, and walks us through the finer aspects of creating music on Tux's finest OS, in the first of a three-part series. Dan Rutter weaves his usual magic proving he really does have the answer to any question ever posed, while Hotbox gets some serious fuel injection and Logan Booker ponders how one could possibly make *Lost* better. See, your brain is feeling heavier already!



TECHNIQUE CONTENTS

Making music in Linux 90
Leigh Dyer knows that a happy musician is a free musician. And what could be happier than a free musician, using a free operating system to make free music? The master guru shows you how…

Input Output 94
Daniel Rutter is an anagram of 'A tit run elder'. This makes him perfect to answer all your burning tech related questions. Apparently.

Hotbox 96
Sometimes our box gets so hot we have to rub liniment on it. But enough about ours – show us yours!

Fallout 98
Logan Booker gets totally *Lost*, in an attempt to re-live his childhood in a dark, dank cellar with only a rat, two pens and 43,000 sheets of A4 paper for company.

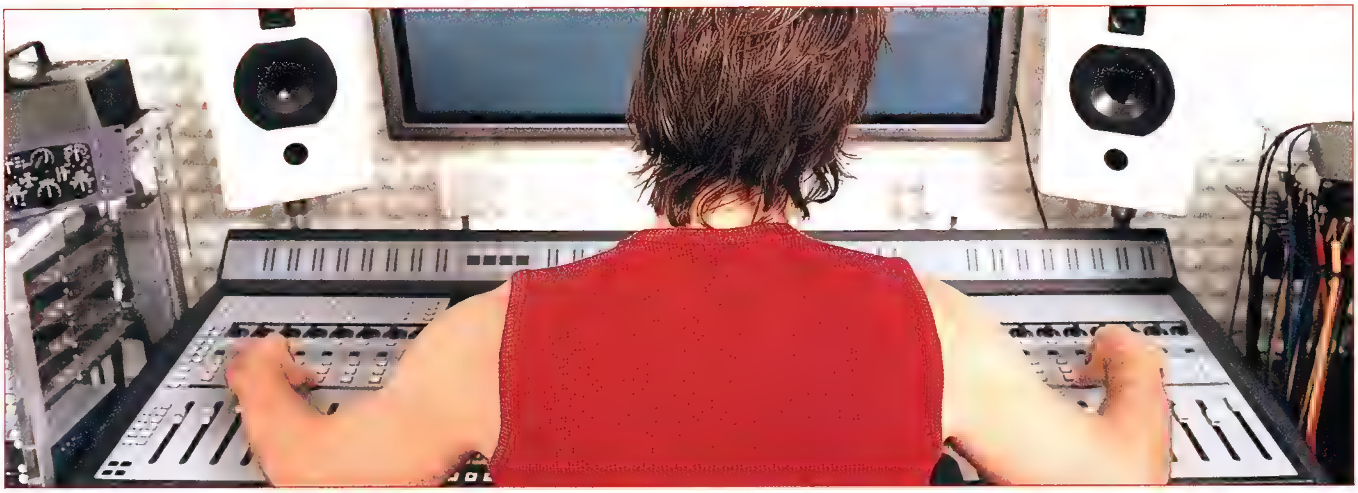
Have an idea for an *Atomic* tutorial?

Then send an email to lbooker@atomicmpc.com.au!

When it comes to tutorials, *Atomic* likes to tackle the hard stuff. If it's not hard enough, we just don't do it. Alright – that's not necessarily true, because every once in a while, we like to cover the easy tutorials too. Not so much easy as basic, you know… building the skills, the foundations you need so you can have a go at those tricky tutorials.

We know that techniques change, as does technology, and guides that might have been useful a few years ago can be close to useless today. So, if you have an idea for a basic tutorial, like soldering, water-cooling or harpooning whales even, let us know.

Now go email!



DIFFICULTY EASY

Making music with Linux, Part 1

Leigh Dyer hands the hacking over to his less tone-deaf side.

Back in *Issue 63* we looked at the creative potential of Linux, with a peek into the world of open source music production. Unfortunately, it wasn't much more than a peek, which is why we're here with the first of a three-part series on producing music under Linux. We'll look at the full range of tools available, the frameworks that bring them together, and the tweaks that will give you the best performance you can get.

Frameworks

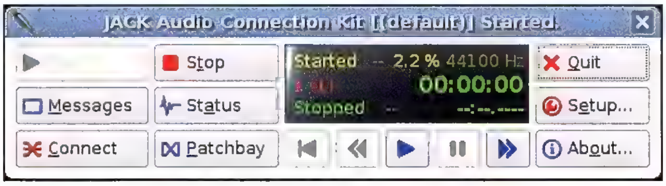
The Linux studio framework is built on two key components: The Advanced Linux Sound Architecture (ALSA) and the Jack Audio Connection Kit (JACK). The ALSA project produces drivers for an enormous range of sound cards, from simple on-board hardware to high-definition surround sound cards and professional multi-track recording cards with multiple inputs and outputs. It also supports MIDI hardware and software, and allows you to control how the MIDI components of your system work together.

JACK sits on top of ALSA, providing seamless software mixing for multiple audio streams, and allowing music applications to feed audio data among themselves. When combined with ALSA's MIDI routing features, this gives you a powerful framework for connecting music applications together into a virtual studio.

Entering the Rosegarden

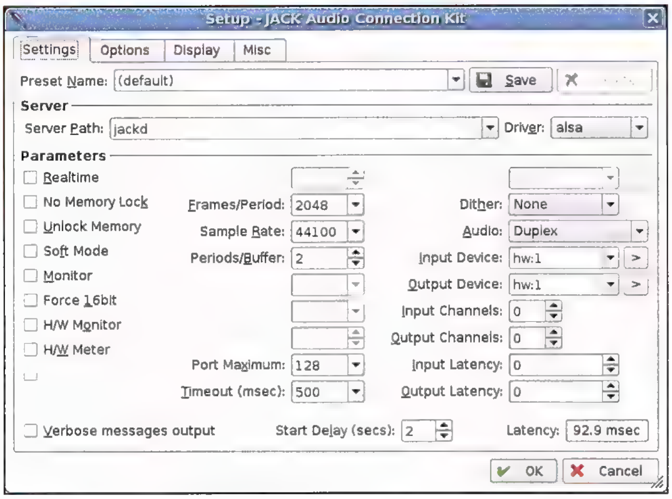
We'll show what you can do with ALSA and JACK using Rosegarden, an integrated MIDI sequencer and audio recorder. It's not quite as powerful as its expensive proprietary competitors on Windows or Mac OS X, but it covers the basics well, and it also supports software synths, effects plug-ins, and audio time-stretching. If you're running Ubuntu, this should install everything you need:

```
sudo apt-get install jackd qjackctl rosegarden
qsynth vkeybd
```



Started -- 2.2 % 44100 Hz
00:00:00
Stopped

QJackCtl lets you handle JACK without tooling around on the command line.



Preset Name: (default)

Server

Server Path: jackd
Driver: alsa

Parameters

☐ Realtime
☐ No Memory Lock
☐ Unlock Memory
☐ Soft Mode
☐ Monitor
☐ Force 16bit
☐ H/W Monitor
☐ H/W Meter

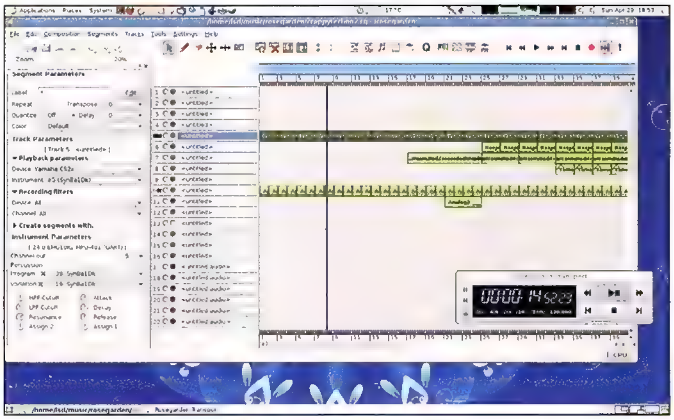
Frames/Period: 2048
Sample Rate: 44100
Periods/Buffer: 2
Port Maximum: 128
Timeout (msec): 500

Dither: None
Audio: Duplex
Input Device: hw:1
Output Device: hw:1
Input Channels: 0
Output Channels: 0
Input Latency: 0
Output Latency: 0

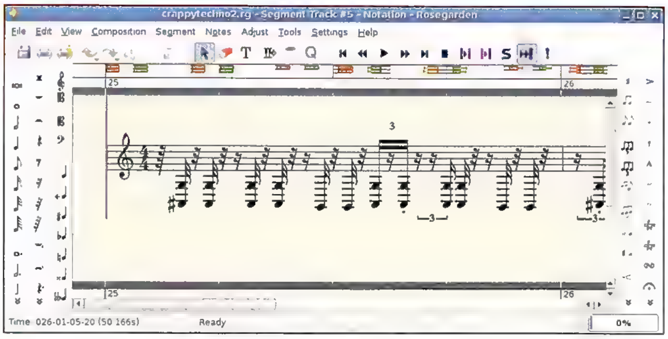
☐ Verbose messages output
Start Delay (secs): 2
Latency: 92.9 msec

These conservative settings should work well on most systems.

QJackCtl is a great JACK front-end, which nicely integrates it into your desktop. It lets you edit your JACK settings, start and stop the JACK daemon and edit both your JACK audio and ALSA MIDI connections. After running it, either from the command line or from the Applications

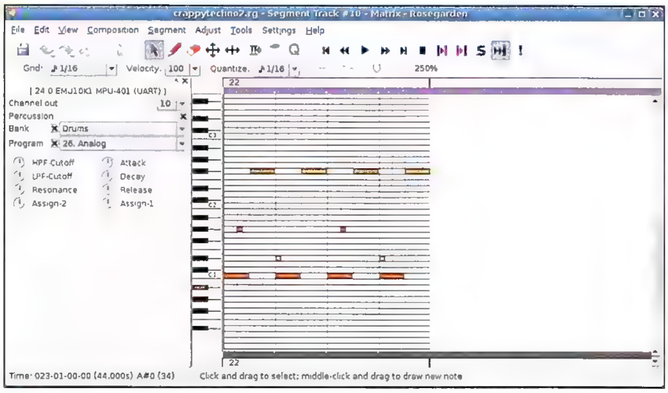


Rosegarden is the best open source sequencer around.


crappytechno2.rg - Segment Track #5 - Notation - Rosegarden
File Edit View Composition Segment Notes Adjust Tools Settings Help
25
26
3
0%

Time: 026-01-05-20 (50.166s)   Ready

Music nerds can use the Notation editor...


crappytechno2.rg - Segment Track #10 - Matrix - Rosegarden
File Edit View Composition Segment Adjust Tools Settings Help
HPF Cutoff
LPF-Cutoff
Resonance
Assign-2
Attack
Decay
Release
Assign-1
22
C3
C2
C1

Grid: 1/16 Velocity: 100 Quantize: 1/16 250%

| 24 0 EMU10K1 MPU-401 (UART) |
Channel out 10
Percussion
Bank Drums
Program 26. Analog

Time: 023-01-00-00 (44.000s) A#0 (34)   Click and drag to select; middle-click and drag to draw new note

...while the rest of us use the Matrix editor.

menu, click 'Setup' to edit your audio settings. For now, we'll stay conservative – set 'Frames/Period' to 1024, and keep the 'Sample Rate' at 44100Hz.

If you have multiple audio devices, you can choose between them by clicking the arrows next to 'Input Device' and 'Output Device'. Click 'OK' to save your settings, and click 'Start' in the main window to start the JACK daemon. If the yellow text in the status area of the main window reads 'Started', you're good to go.

You can now fire up Rosegarden from your Applications desktop menu – just ignore the warning about your system timer resolution for the moment. The user interface should look familiar if you've used other MIDI sequencers, with a list of individual tracks on the right and details on the current instrument on the left. You can use the transport controls, either in the toolbar on the main window or in the separate Transport window, to play, stop, rewind and fast-forward.

To get some notes down, select the pencil-like Draw tool from the toolbar and draw a line across one of your MIDI tracks. This creates a segment – a named chunk of sound that forms the basis for your compositions. Right now your segment will be empty, but if you double click on it, the segment editor will appear. There are actually a few different segment editors, and the default one uses musical notation, which might not be ideal. You can use a different segment editor by right clicking on a segment and selecting the appropriate option, or by changing the default in the preferences.

The Matrix segment editor is generally the best option: It presents a 'piano roll' interface that should again be pretty familiar to anyone that's used another MIDI sequencer, letting you draw in notes with the mouse. There are a lot of editing options buried in the menus, so be sure to poke around – it's an important tool to learn.

Soft and synthy

Now that you have some notes, we need to turn them into sound. This is why we installed QSynth before – it's a GUI frontend for FluidSynth, a great general-purpose software synth that uses SoundFont files. There's a bunch of free SoundFonts on the Web from sites like **hammersound.net**, ranging from individual instruments – both real and synthetic – to ensembles and full General MIDI sets.

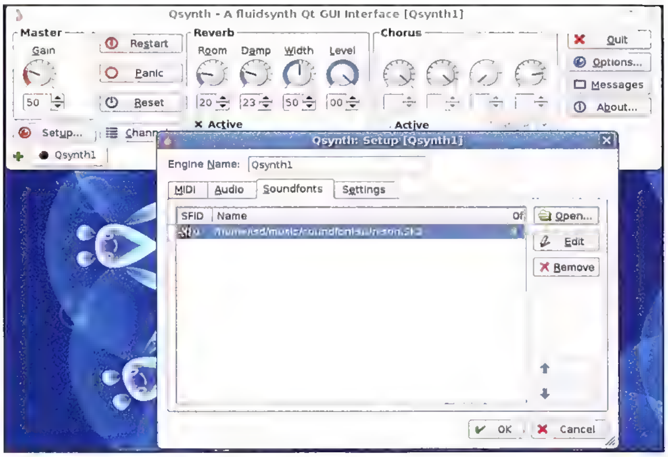
Annoyingly, many of these are compressed using a tool called sfArk, though it runs under WINE, and there's a rough Linux version available as well from **melodymachine.com/sfark.htm**. However, some sites have SoundFonts compressed in standard formats: **freepats.opensrc.org/sf2** has a few individual instruments, while **www.personalcopy.com** has some high-quality General MIDI sets.

Once you have a SoundFont to use, open QSynth and hit the Setup button. Under Audio, make sure you're using the 'jack' driver, and enable the 'Auto Connect JACK Outputs' option. Load in your SoundFont under the SoundFonts tab, then click 'OK' and answer 'Yes' to restart the synth.

Switch back to Rosegarden, and open the Composition/Studio/Manage MIDI Devices menu option. Here you can configure the MIDI devices available for both input and output. In the 'Play devices' list, the first option should be called 'General MIDI Device'. Click on the drop-down next to this, and select the 'Synth input port' option – this is your QSynth setup. Any tracks using the 'General MIDI Device' – configurable on the left side of the main window – will now have their output routed to QSynth, so you should be able to hit Play and hear your carefully-entered notes. Another way to get sound out of Rosegarden is with an embedded software synth using the Disposable Soft-Synth Interface (DSSI). There aren't many DSSI synths yet, but Ubuntu includes two great examples: Hexter, a Yamaha DX7 emulator and Xsynth, a simple virtual analogue synth. Install them with this command, and then restart Rosegarden to make them available:

```
sudo apt-get install dssi-plugin-hexter dssi-plugin-xsynth
```

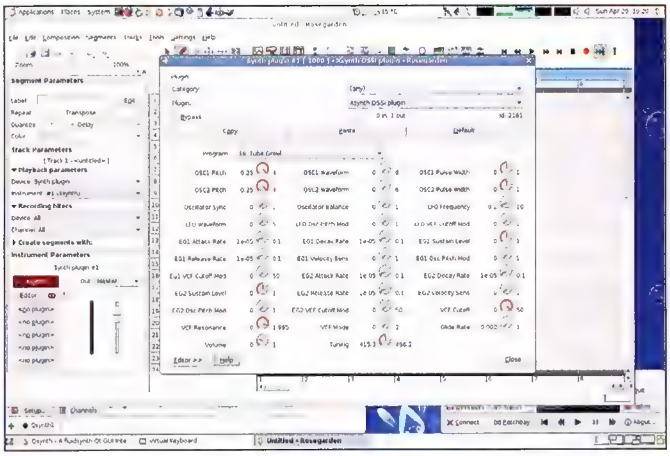
To assign a DSSI synth to a track, set the 'Device' option under


Qsynth - A fluidsynth Qt GUI Interface [Qsynth1]
Master
Gain
Restart
Panic
Reset
Reverb
Room
Damp
Width
Level
Chorus
Active
Quit
Options...
Messages
About...
Setup...
Channels
Qsynth1
Qsynth: Setup [Qsynth1]
MIDI
Audio
Soundfonts
Settings
SFID
Name
Of
Open...
Edit
Remove
OK
Cancel

Gain 50 Room 20 Damp 23 Width 50 Level 00

Engine Name: Qsynth1

QSynth gives you access to a world of (mostly cheesy) SoundFonts.


Untitled - Rosegarden
Synth plugin #1 [1000] - Xsynth DSSI plugin - Rosegarden
Segment Parameters
Track Parameters
Instrument Parameters
Close

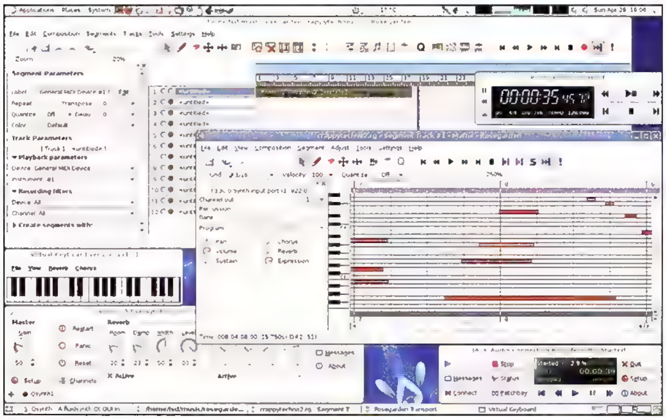
We supply the DSSI Xsynth plug-in, you supply the knob gags.

'Playback preferences' to 'Synth plugin', click the '<no synth>' button under 'Instrument Parameters', and then select a synth from the 'Plugin' drop-down that appears. Use the 'Program' dropdown to select a preset sound. Xsynth is great for fat lead and bass sounds, while Hexter is perfect for those classic electric piano sounds, though both synths have a lot of flexibility.

Recording MIDI

Of course, you can also record MIDI notes into Rosegarden instead of drawing them with the mouse. Re-open the Manage MIDI Devices window and click on the drop-down next to 'MIDI hardware input device' in the 'Record devices' list. If you have a real keyboard hooked up to a MIDI input on your system, select that input here. Otherwise, you can try the Virtual Keyboard – run 'VKeyBd' from your desktop Applications menu, and a small keyboard should appear on-screen. It should appear in the 'Record devices' dropdown list.

With your MIDI input configured, you should be able to hear notes as you play them if you have one of your QSynth tracks selected. You can also record in realtime by clicking the small yellow circle next to the track you want to record in the track list, and then pressing the red Record button in the tool bar. After a quick count-in, your song will start to play, and any notes you play on the keyboard (real or virtual) will be recorded into a new segment. Hit the Stop button to stop recording and then Rewind and Play to hear the results. If it's not quite right, you can delete the segment with the Erase tool, or edit it with a double click.



Three octaves of raw on-screen keyboard power – who needs the real thing?

HARDWARE OPTIONS

If you're just starting out, you don't need to worry much about hardware – you probably have everything you need already. JACK will run on just about any sound device, including on-board chipsets, and as long as you don't mind using the mouse to enter your notes, you can create a huge array of sounds entirely in software. Some cards do handle JACK much better than others though, so if you're not happy with your JACK performance, it's worth upgrading.

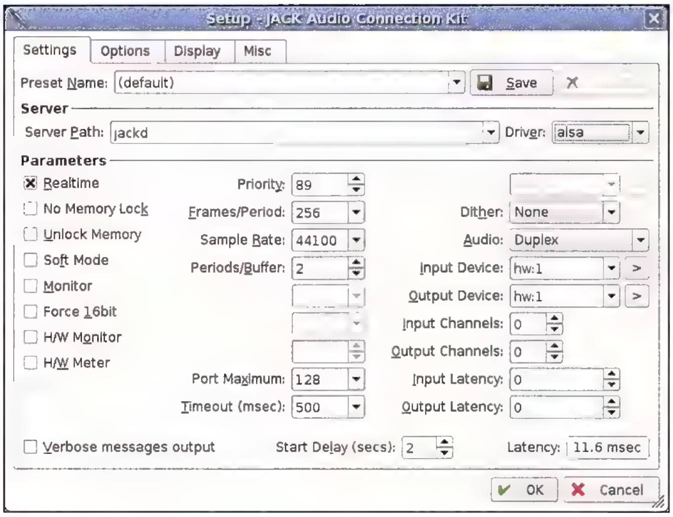
Even a cheap Audigy card can make JACK run smoothly and it'll probably have better sound quality than an on-board setup. Do some research before buying though – check the ALSA driver matrix (**alsa-project.org/alsa-doc**) to make sure the card you want is supported, and Google around to see if others have tried it with JACK.

Later on, you may want to get some MIDI hardware. For $200 or less you can get a MIDI controller keyboard. These don't produce sounds on their own, but they're perfect for recording notes into Rosegarden or controlling software synths. Most modern MIDI controllers come with direct USB connections, and should work well with ALSA.

If you're willing to pay more, or scour eBay for bargains, you can get some great keyboard synths, though you'll need a MIDI interface on your PC for these. Some sound cards have MIDI ports, or can have them added through an old-school gameport breakout cable, and there are some affordable USB MIDI interfaces as well.

Real-time performance and the dreaded 'xrun'

At this point, you might be getting annoyed with JACK, as there's a small but noticeable delay between playing your keyboard and hearing the sound from QSynth and the sound might be breaking up a little as well. The delay is a result of JACK's mixing buffers, which have to store audio briefly before playing it and the glitches, called 'xruns', are caused when JACK fails to mix its buffer in time to play it. The amount of delay is related to the size of the mixing buffers, and is shown as the 'Latency' value in the QJackCtl settings box. Similarly, the number of xruns is shown in the QJackCtl main window.



Setup - JACK Audio Connection Kit

Preset Name: (default)

Server Path: jackd
Driver: alsa

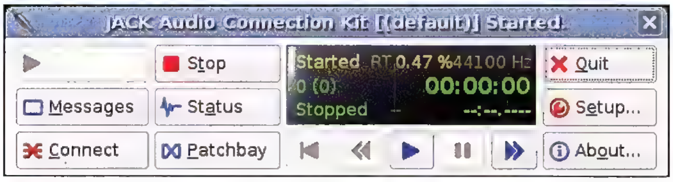
☒ Realtime
☐ No Memory Lock
☐ Unlock Memory
☐ Soft Mode
☐ Monitor
☐ Force 16bit
☐ H/W Monitor
☐ H/W Meter

Priority: 89
Frames/Period: 256
Sample Rate: 44100
Periods/Buffer: 2
Port Maximum: 128
Timeout (msec): 500

Dither: None
Audio: Duplex
Input Device: hw:1
Output Device: hw:1
Input Channels: 0
Output Channels: 0
Input Latency: 0
Output Latency: 0

☐ Verbose messages output
Start Delay (secs): 2
Latency: 11.6 msec

Realtime priority lets you use much tighter JACK settings.



JACK Audio Connection Kit [(default)] Started

Started RT 0.47 %44100 Hz
0 (0) 00:00:00
Stopped --:--.----

Look ma, no xruns!

Luckily, you can fix both problems by running JACK with realtime priority. This helps JACK get CPU time right when it needs it, which avoids xruns, and lets you shrink your audio buffers, reducing latency. Running tasks with realtime priority requires special privileges, and on most modern Linux systems you can enable these on a per-group or per-user basis through the '/etc/security/limits.conf' file. Add these lines to the file to allow realtime access to users in the 'audio' group, which most desktop users should already be a member of:

```
@audio - rtprio 99
@audio - memlock 2500000
@audio - nice -10
```

Log out of your desktop and log back in to make the changes take effect. Then run QJackCtl again, hit the 'Setup' button and enable the 'Realtime' option. Click 'OK' and then 'Start' and with any luck JACK will run, and 'RT' will be displayed in the QJackCtl status area. If all goes well, try dropping the 'Frames/Period' value as well – a decent PC with a reasonable sound card should run well a setting of '256', which equates to just over 10ms of latency.

Next month!

Be sure to head back next month, when we'll be taking a closer look at the range of software synths for Linux, and how to bring them all together using JACK and ALSA.

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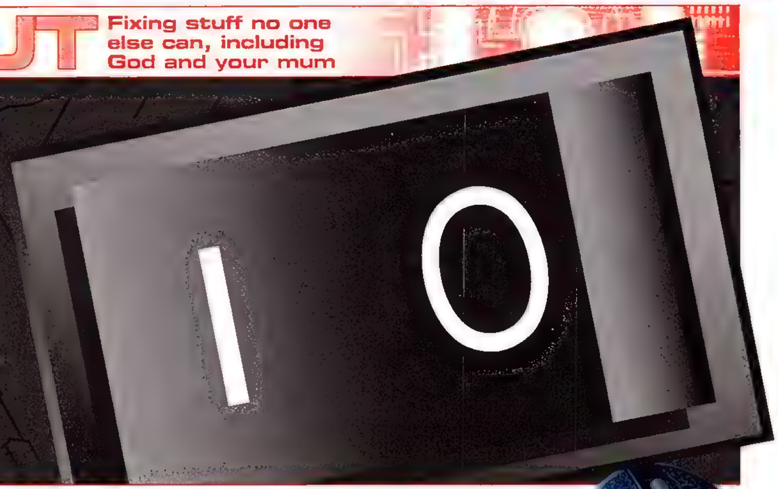


Disks for Dan

Daniel Rutter does his best to answers all manner of drive questions this month. Drive a question to him at **io@atomicmpc.com.au**

B versus b

Is it possible to boot Windows XP from a USB 2.0 drive? And secondly, will I notice a substantial performance increase over SATA II? The idea of USB 2.0 speeds (480Mb/s) vs SATA II speeds (300MB/s) got me thinking.

Steve Q

Yes, in theory at least; you can find a decent guide to doing it at **tinyurl.com/dhbcm**. It's nowhere near as elegant as doing the same thing under Mac OS, but it can be done.

You don't want to do it, though, if you're looking for better performance.

Regrettably, USB 2.0 is 480 megaBITs per second, while SATA II (which is more correctly called SATA/300, not that anybody but the Serial ATA International Organization cares), is 300 megaBYTEs per second, about five times USB 2.0's bandwidth.

The 'about' is because a megabit is a million bits, while a megabyte is 1,048,576 bytes. The International Electrotechnical Commission wants everybody to call these normal megabytes 'mebibytes' instead, and change 'megabyte' to mean a million bytes. But nobody does. Oh, except hard disk manufacturers, sort of; they don't talk about mebibytes or gibibytes, but they *do* use million-byte megabytes and billion-byte gigabytes to make their drives sound bigger.

Got all that? Good.

As I write this, the very fastest raw read transfer rate for any SATA hard drive is nudging up against 90 megabytes per second. That's about 1.6 times the data per second that USB 2.0 can theoretically handle, but this hardly matters as it only applies to the outermost tracks of the drive and the drive itself is one of those ridiculous 15,000rpm WD Raptors – the fastest 7200rpm drives are down around 80MB/s.

The clincher is that there are close to no desktop computer tasks that'll ever be able to use that data rate for more than a fraction of a second anyway.

The fastest USB flash drives are down around 30 megabytes per second for sustained read transfers, and rather slower for writes. A PC can boot quite quickly from flash memory, because flash RAM has a much lower seek speed than any hard drive, but there's unlikely to be much difference either way.

In the real world, desktop computer users can hang at least a couple of hard drives off one USB 2.0 port and never notice any significant slowdown. You don't need SATA/300, either; it's nice to have, but the difference between it and SATA/150 is unnoticeably small for any desktop computer task, no matter how many drives you have.

Fast, yet slow

When I start up my computer, I get a 'Reboot and Select proper Boot device or Insert Boot Media in selected Boot device and press a key' error before the Windows loading screen comes up.

Every time.

I press the reset button, the computer restarts, and 90% of the time continues to boot as normal. The other 10% of the time, I press reset one more time, and *then* it boots normally.

I don't claim to be a computer expert, but I don't think that's supposed to happen.

I have a Western Digital fancy pants SATA Raptor hard drive, which is lovely whiz-bang fast. There are no other hard drives (though there used to be, I ghosted my XP installation from an old hard drive when I upgraded last) and the BIOS settings appear to be correct, to my generally computer technical brain.

Any clues as to what might be causing this? I'm concerned mostly about any long-term issues, more than the minor inconvenience of needing to press reset every time I start my computer.

James Tapper

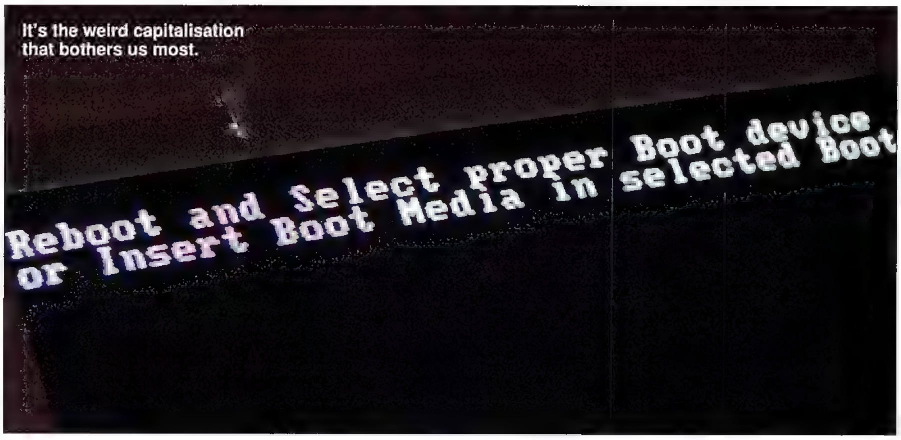
It's the hard drive. Your Raptor takes longer to spin up than your old drive did, partly because of its higher rotational speed, and partly because 'server' drives like this (allegedly) don't push their motors as hard as consumer drives, because they don't *need* to spin up super fast when they expect to be running 24/7 and never put to sleep.

So the new drive just doesn't spin up in time for the motherboard. The computer starts trying to boot, finds no ready drives, and barfs.

Your BIOS setup program may include an adjustable delay before the boot process starts. Add a few seconds to it and you should be fine. You may be able to delay boot a bit in other

I/O OTM wins a Logitech G5!

There's a mouse in the house. Okay, it's not in the house, it's in IO. And it looks damn good.



It's the weird capitalisation that bothers us most.

```
Reboot and Select proper Boot device
or Insert Boot Media in selected Boot
```

ways, too – though if you have the large amount of RAM that any computer with a 10,000rpm drive in it ought to also have, turning full startup memory checking on may be a bit too much of a delay.

(Most perverse way of delaying startup: Set the CD-ROM drive first in the BIOS boot order, and put a non-bootable CD in it. Now it'll have to spin up the CD first to see if it can boot from it; by the time it discovers that it can't, your hard drive will be ready!)

If all else fails, just stick with the pressing-reset strategy. The error is not symptomatic of an impending failure.

The capacity shuffle

I I have Partition Magic version 3 installed, along with System Commander. I only use one OS, Windows 98.

I have one large physical HDD split into two partitions, C and E. I want to take some space from E and add it to C.

I can't get to Partition Magic, though. Even with the PM CD in the CD-ROM drive and boot from CD-ROM chosen from BIOS, the PC does the BIOS check routine and goes immediately to System Commander, with no change to start PM without Win98 running. When I start PM under Windows 98, it seems to reboot, then goes right to System Commander.

Paul

O I've never tried to do what you're doing, so I don't know what the problem is.

I presume the computer can boot from *other* CDs OK, though. If it can't, then obviously that's the problem, not some PM/SC interaction.

I do, however, have a suggestion – use something else that does the stuff that PM does. The GParted Linux LiveCD (**gparted.sourceforge.net/livecd.php**) looks like a goer.

I haven't tried *it*, either, but it's free.

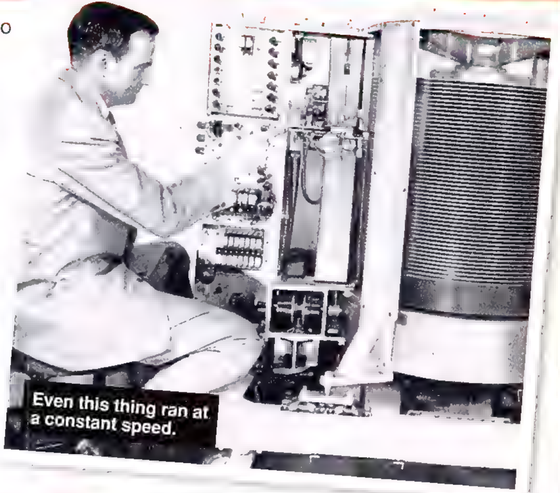
The next option is to take your PM/GParted/whatever CD and your computer's hard drive to another computer, plug your drive into that other computer, boot the CD and do the deed there. When your drive isn't the boot disc, you'd probably even be able to connect it via a USB-to-ATA adaptor and fool with it that way or just do it by brute force and copy all the stuff off your drive onto another drive with enough space, then nuke and repartition.

Which is a dumb solution, but you know what they say in the Army – if it's stupid but it works, it ain't stupid.

Bits per acre

I What's the deal on gaining capacity with increasing HDD platter diameter? Does a typical hard drive have a fixed rpm? Do the bits near the rim have a different density from the bits near the hub? We're arguing about this.

Cole and Glen



Even this thing ran at a constant speed.

O Yes, hard drives run at a fixed rotational speed. Bits per linear inch, though, remain the same for the whole platter, and so you get higher transfer rates from the outer tracks. The read/write hardware just works slower for the inner tracks.

High performance hard drives these days often have *smaller* platters than consumer drives, to reduce the distance the head assembly has to move to get from track to track. This is because seek speed, not transfer rate or capacity, is the big limiting factor for many server applications.

Consumer drive platters still pretty much fill the 3.5-inch casing, though.

I/O OF THE MONTH

Brain transplant

I I was hoping you could help me decide if it's worth buying a Seagate Barracuda 7200.8 ST3250823A 250GB drive with firmware version 3.03 on it, to board-swap my non-spinning Barracuda 7200.8 ST3200826A 200GB drive with the same firmware version.

Do you think that the difference in drive size will matter?

My 200GB drive has just stopped spinning, and I've been told that if you just swap the board on the back with the exact same model that this will fix the issue nine times out of 10.

Vincent Azara

O Yes, the size difference *will* matter. Everything, from the capacity to the firmware version to the board revision number, has to be exactly the same for a controller swap to be likely to work.

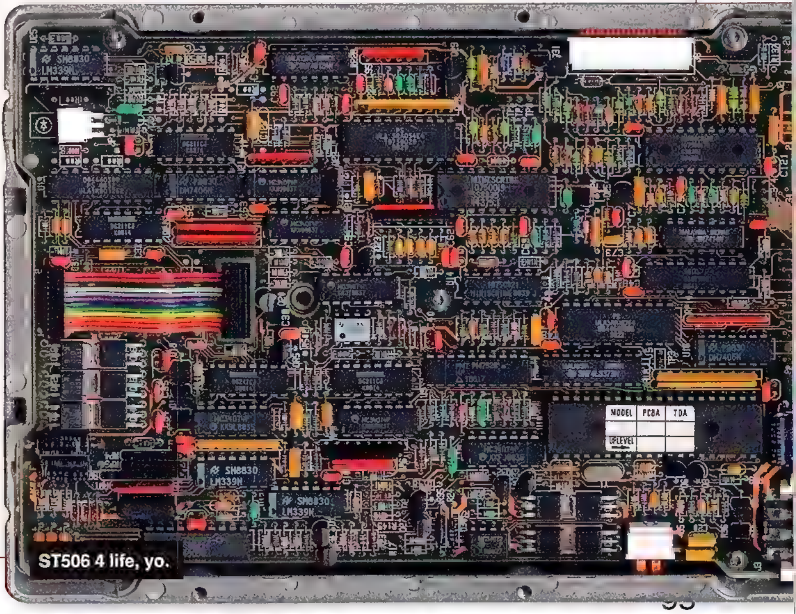
Unless the drive contains a billion digit prime number or all of your Swiss banking information or something, any attempt to repair it is unlikely to be a worthwhile investment. These kinds of events are the universe telling you that you should have been making backups.

In this particular case, the 200GB drive uses two 100GB platters, while the 250GB one uses two 133GB platters – so it could actually be a 266GB drive, if not for the demands of the monkey molesters in Seagate's marketing department. Swapping in a controller board that expects a different capacity is generally a recipe for disaster, and using a board that expects different data *density* is worse yet. There's no way it'll work.

There are, however, a number of things on a drive circuit board that can actually be fried. If the drive won't spin up, for instance, then what's often at fault is a motor, power or control IC. Those can be replaced by anybody talented with surface mount rework, and the replacements are generally fairly easy to come by – if not off the shelf, then off any somewhat similar controller board.

It's also often possible to make a near-match controller board into a perfect match by transferring the firmware chip from the dead drive's board onto it. This is another task that requires serious soldering, but it can at least be done. Cheaply, even, if you're good friends with someone who works in electronics prototyping.

Once again, though, you'd better have some nuclear launch codes or a Theory of Everything on that drive to make these gymnastics worthwhile.



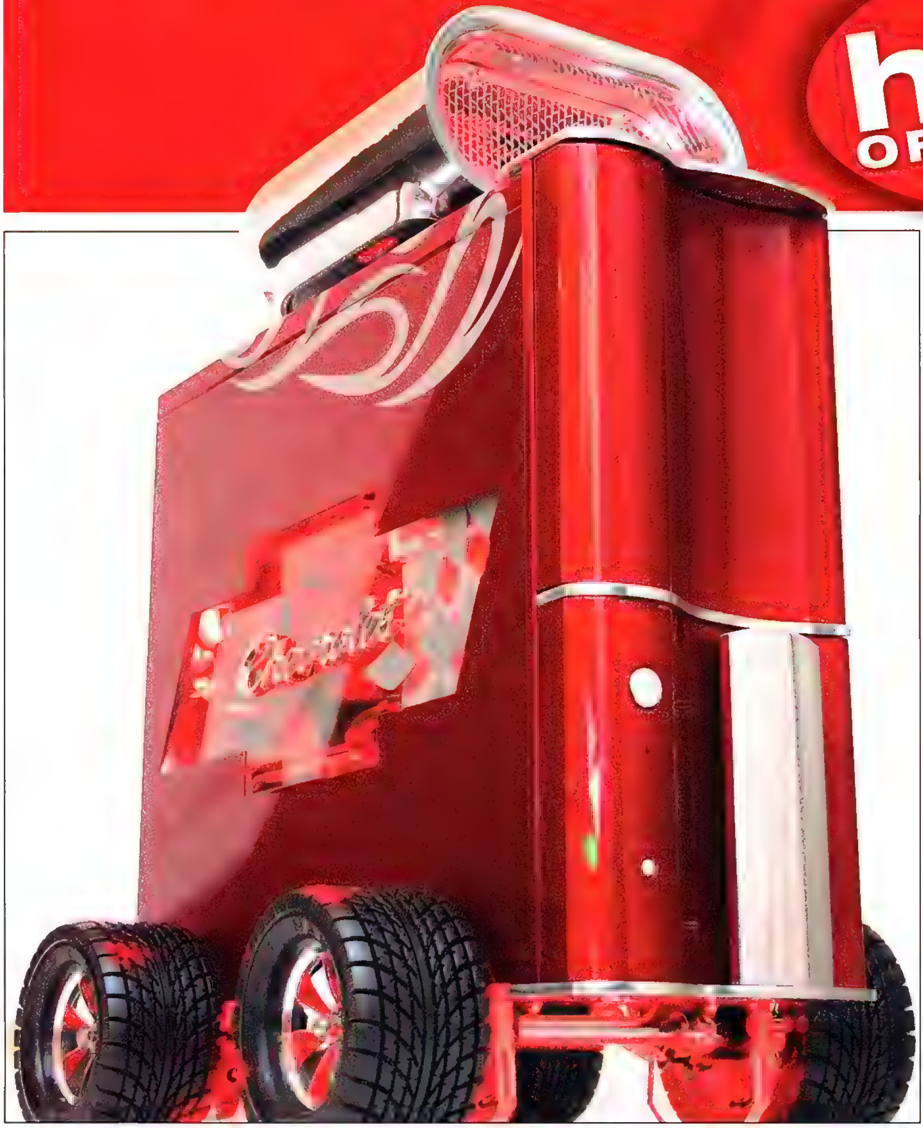
ST506 4 life, yo.

ATOMICHOTBOX

The best reader-submitted custom-made boxes every month

Welcome to Hotbox, where each month we give the best case mod an awesome prize! Want to win? Submit your box now!

hotbox OF THE MONTH



EvEm_Relic's Chevrolet

The opportunity arose for me to have this paint job done, and this started me on the quest to build the rig. It's a metallic candy-apple colour, so that made it an obvious choice to go with a car theme.

Chevrolet was suggested by a friend, so with that I went looking for a suitable case.

The Wavemaster had a nice curved front and being all aluminium I could polish it as well. Once I got it, the window was cut and it was sent off for painting. In the meantime I sourced the Chevrolet badge, bought the acrylic for the window and attached it.

The window panel sits independent of the side panel – I find this doesn't interfere with the strength/balance of the metal. All it needs is a foam surround attached to the metal panel so when it presses against the acrylic it seals it off. Next came the wheels. I spent some time choosing a road-tyre look when purchasing these from a hobby store. I needed to come up with an axle design myself. The axle is a threaded rod inside a polished cylinder with hex nuts at each end.

The axles are attached with brackets that I made up using slotted angle and silver guides intended for curtain rails. Originally I thought the case would rest solely on the

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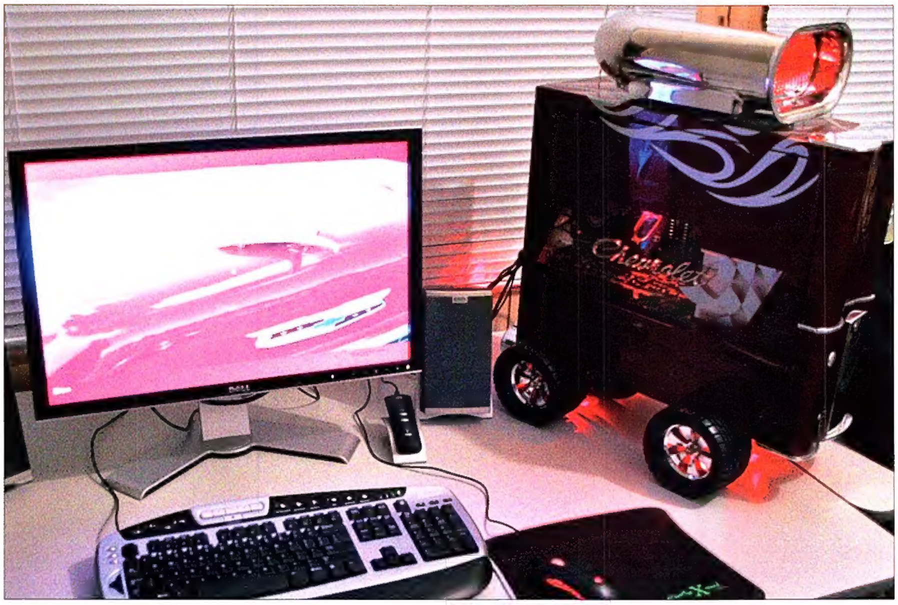
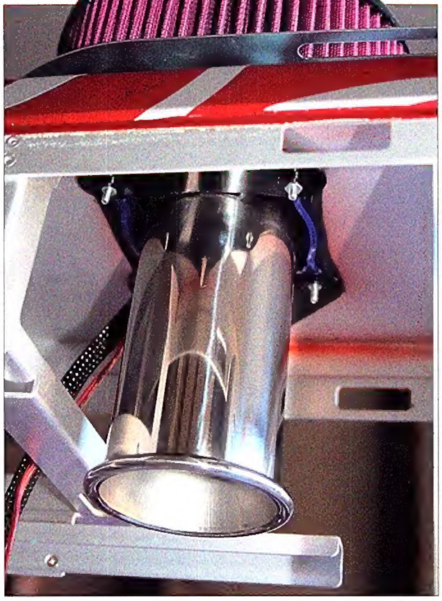
and make sure you include the following details so you can be eligible:

- 6-12 high resolution, well-lit pictures of the inside and outside of your case
- A 500-word description of how you made it, the obstacles you overcame, the tools you used, and your inspiration
- A detailed list of the machine's specs. Include CPU, video card and RAM





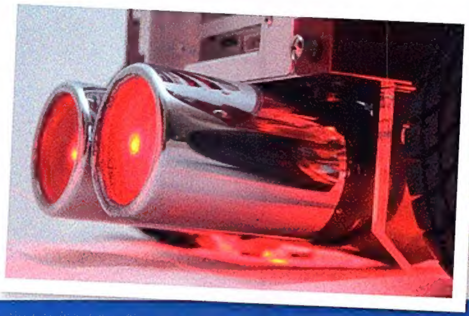
wheels but, as I've added more weight to the case, they gradually flattened. In the end I made up clear acrylic legs that take the weight and allow the tyres to contact nicely.

The dual exhaust was donated to me and has seen real road action. I made up a corner tube to complete it. This hides some cables, as each wheel and the tail pipes are lit with LEDs. The base of the case is covered with mirror contact to reflect the light even more.

Inside, I chose the Thermalright and Tornado partly because they are efficient for air-cooling and partly because it suits the look to have a beefy HSF. On top is the scoop and filter I got from Summit Racing. It took a while to finally spend the money on this but in the end it wasn't hugely expensive and I'm happy with the result. In order to make it perform a function, I mounted an exhaust tip pipe inside the top of the case and a second Tornado inside the filter. This brings cool air in through the front of the scoop, through the filter and down past the RAM.

And no Chevy would be complete without some graphics, so I got two different designs. The large one is on the top and down the sides and the other comes in from the side of the window panel, which ties in with the Chevrolet symbol. When looking in through the window the drive bays are nothing special, so I covered them with thin aluminium. I found this in a hobby store. It is sold in small sheets and is very easy to work with.

It has taken some time but I'm pleased with the way the case turned out.



technicaldetails

CPU
AMD Athlon X2 4200+

MOTHERBOARD
ASUS A8N-SLI Deluxe

RAM
2x 512MB Corsair CMX-4000

VIDEO CARD
2x NVIDIA GeForce 8800 GTX

Extras

- Thermalright XP-90C w/ Vantec Tornado
- 2x 74GB WD Raptors
- 2x 200GB SATA drives
- Vantec Nexus
- Cooler Master Wavemaster
- DVD burner

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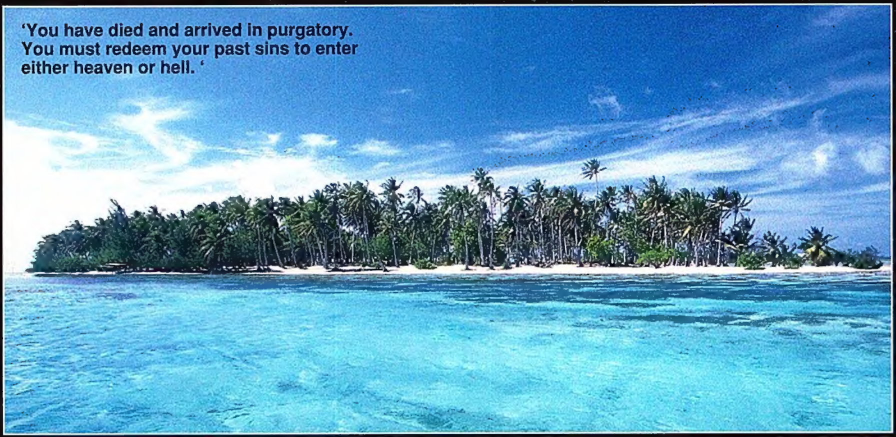
FALLOUT

Funnies and humour from the fallout zone



'You have died and arrived in purgatory. You must redeem your past sins to enter either heaven or hell. '

Lost: The RPG

Logan Booker once again puts pen to paper.

'You are walking though a dense forest. Apart from the chirping of birds in the trees, the only sounds you can here are those of your feet crushing the undergrowth. Still, you can't help but feel uncomfortable, almost as if someone is watching you from the safety of the verdant greenery.'

Sam sucked noisily from his milkshake. 'I shoot at the trees.'

Adam sighed. It was the fifth time Sam had made a violent request of his character. His last demand had involved decapitating a fellow party member with a spoon, a feat Adam had thankfully been able to inform Sam was beyond his abilities. It also hadn't helped that Sam didn't have a spoon.

'Are you sure you want to do that? I mean, you only have three rounds.'

'Yes.' He didn't even hesitate.

'You want to fire all of them, or just-'

'All of them.'

Adam sighed again. 'Okay, role three 20-sided dice and let's see-'

'Whoa, whoa, whoa... let's not be so hasty,' quipped Daniel. It was the first time he'd talked the entire game. 'Three bullets man, what happens if we need them?'

'For what?' retorted Sam. 'There's nothing here. You've been rolling your Spot checks. Has anything come up?'

'I've rolled ones every time. Of course nothing's come up!'

'Whatever. Adam, I'm shooting the trees.' The dice left his hand and clattered onto the table, tumbling between pieces of paper, discard drink cans and plates of pizza crumbs, until they finally stopped beside an empty jug of milk. Despite the odds being in the same galaxy as a planet populated entirely by beautiful naked Korean models, the dice all read 20 – the highest possible roll.

'You have to be kidding me... you have to be fuc-'

Sam was ecstatic. The look on his face had no rival, except perhaps that of a triceratops discovering a dinosaur-sized nuclear bunker during that final meteor storm. 'Looks like Sawyer's got game, losers!'

Daniel-as-Hurley was not impressed, and Mary-as-Kate sitting beside him, head in hands, did not bode well either.

Adam felt a sigh building up in his lungs, but managed to suppress it. Instead, he coughed politely. 'Alright Sawyer, let's see what you hit.'

Mary somehow looked both scared and angry. 'Can I punch Sawyer in the head after this?'

'Tell you what – you can punch him right now.'

A high-pitched 'Roll the damn hits loser!' from Sam put a stop to further conversation.

Adam rolled his dice.

What came up made him laugh maniacally. 'You're going to love this. You really are.'

The three players exclaimed 'What?' almost in unison, with varying degrees of emotion, Sam's by far the most jubilant and Daniel's close to a whimper.

'The first bullet critically hits Jack. He was hiding in a tree just in front of you. Because it's a critical, I roll eight d20s and...' There was the sound of plastic dice hitting table. 'Jack takes 103 points of damaged, killing him in an explosion of gore.'

Mary started to cry softly. Daniel spat out his drink. Sam was unfazed. 'Next!'

Adam was more than happy to go on. 'Sure thing. Your second round was also a critical hit, catching the captain of the US submarine that had come to rescue you square in the heart.' More dice. '122 damage! He's paste as well.'

'Wha-?' was all Sam could say. He looked like a giant wheel of magical, puppy-hating cheese had just run over his dog. 'What did you say? Submarine? Rescue?'

Adam chuckled. 'That's not the best bit. Your last bullet bounced off of a tree and hit Kate for 98 damage.'

'Putting me on... negative 74 health points,' she managed to gasp.

Sam dropped his pencil and undoubtedly a small part of his soul. Any enthusiasm he may have felt had been unceremoniously sucked from his psyche like gelatin balls from a Pearl Milk tea.

No one spoke for a good two minutes as the tragic events settled in their minds. Oddly, it was Daniel who finally had the courage to speak.

'Man... this would make for an awesome episode.'

NEXT MONTH

WATER-COOLING SUPER GUIDE

What makes it super exactly? The fact it can be read and understood by anyone! We cover the basics of water-cooling, so you can be completely prepared when you embark on your first liquid-powered excursion. Don't lift a rubber tube without it!

EXCLUSIVE: FALLOUT 3

Bethesda, a developer that loves all things *Atomic*, presented us with the unique opportunity to see Fallout 3 for the first time, ever. No one else in Australia will have as comprehensive coverage as us. Truth!

COMPUTEX 2007

Craig Simms will be your man on the ground for the biggest technology expo in the world. All the gossip, motherboards, video cards, CPUs and booth babes will be revealed in our write-up. Except the booth babes, unless Craig begs for a happy ending.

BIOSHOCK

A shocking new game from the minds behind System Shock 2. With the game close to release, we thought we'd revisit this prime example of FPS goodness and get the final word from the developers on its awesomeness.

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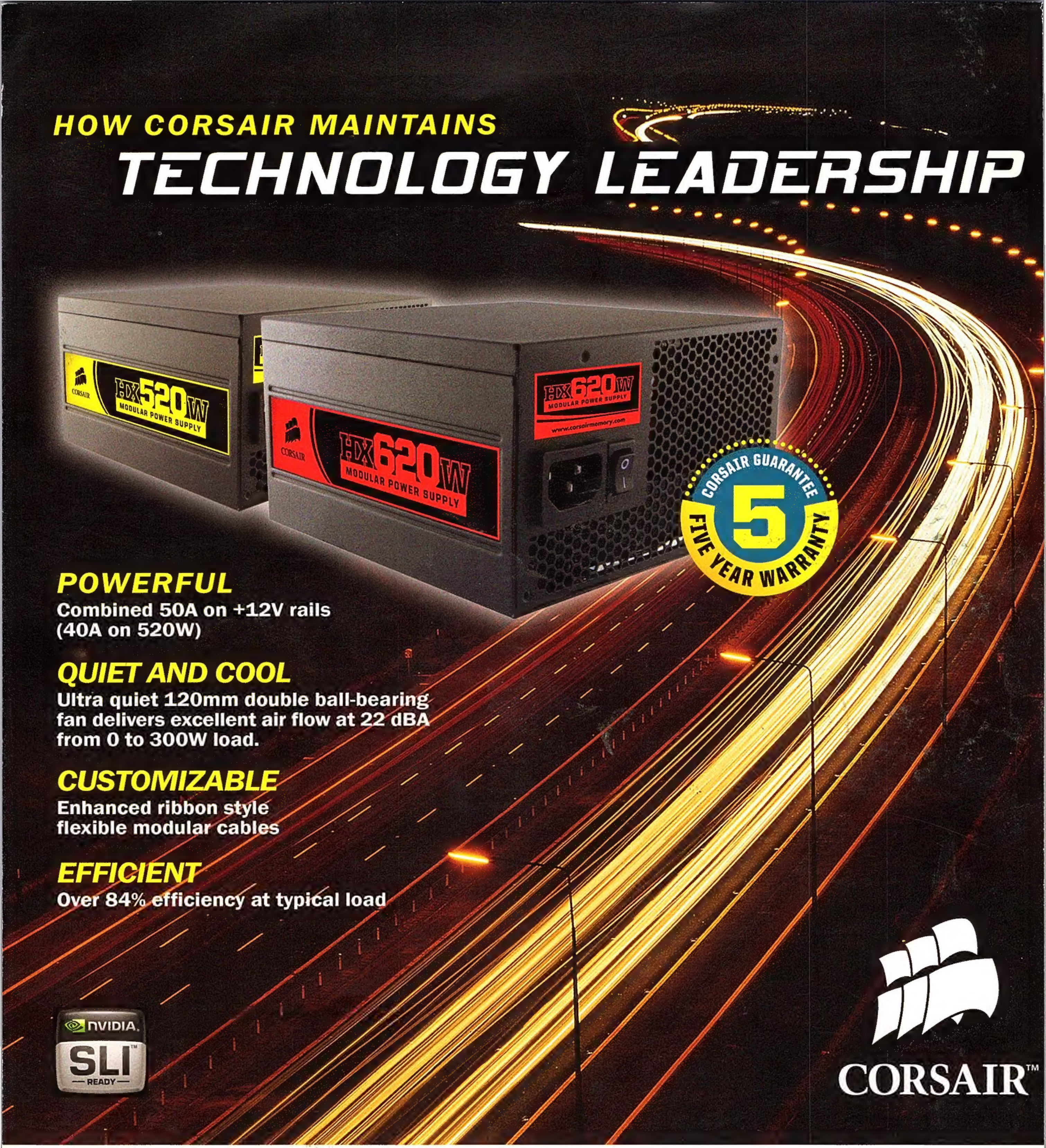
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